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(54) **NEEDLE PROBE GUIDE**

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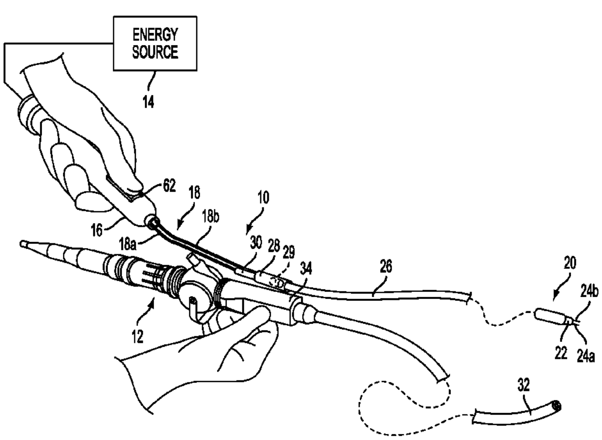
(57) **ABSTRACT**

A device for guiding electrodes relative to a tissue treatment region. The device can comprise a body have a plurality of passages therethrough. Each passage can axially restrain an electrode positioned therein. When each electrode is axially restrained in a passage, the distal ends of the electrodes can be spaced a predetermined distance apart. Further, the electrodes can be held in a parallel or substantially parallel alignment when axially retained in the passages. The predetermined distance between the electrodes can correspond to a treatment distance in a tissue treatment region and the distal ends of the electrodes can be operably structured to conduct current therebetween when at least one of electrodes is energized by an energy source.

11 Claims, 56 Drawing Sheets



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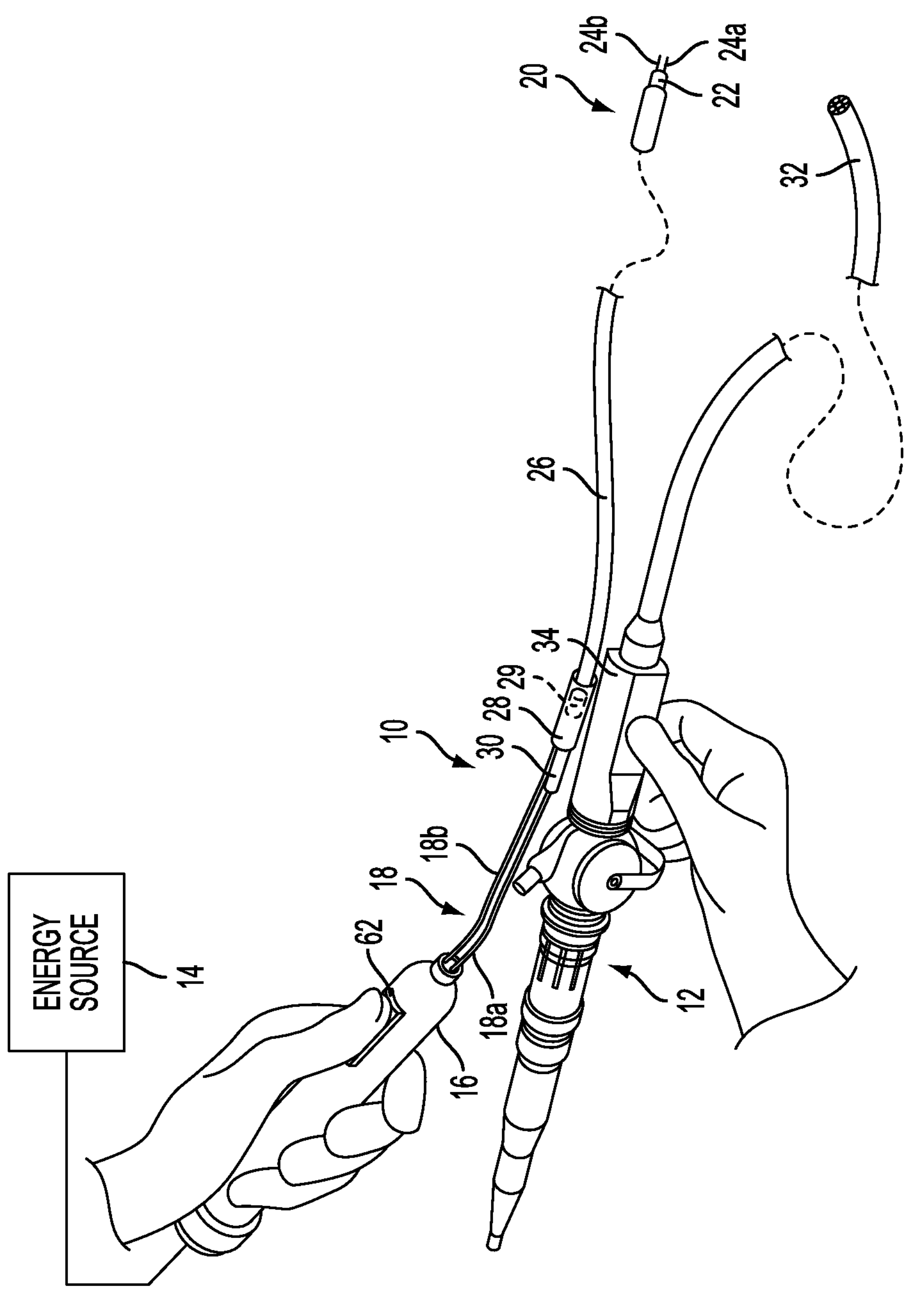
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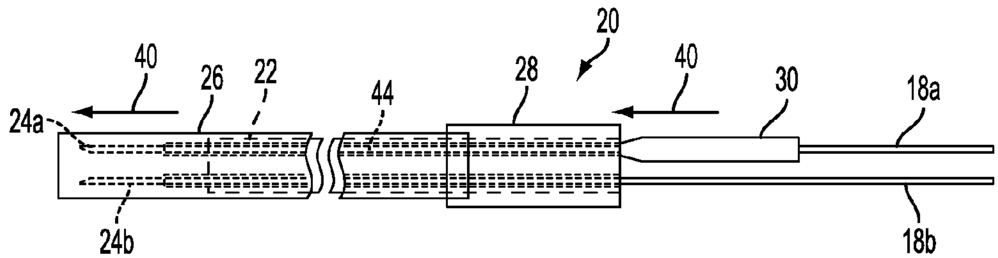
FIG. 1



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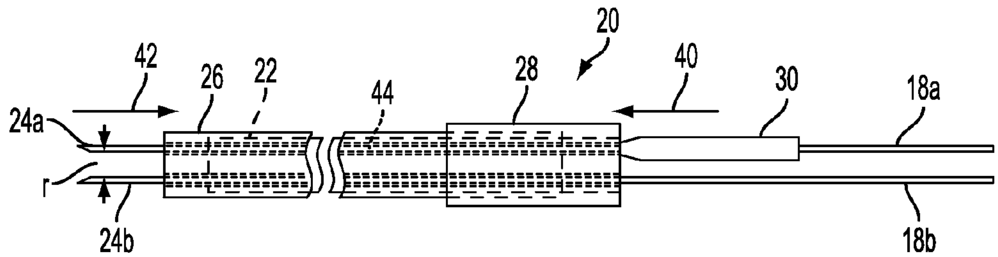

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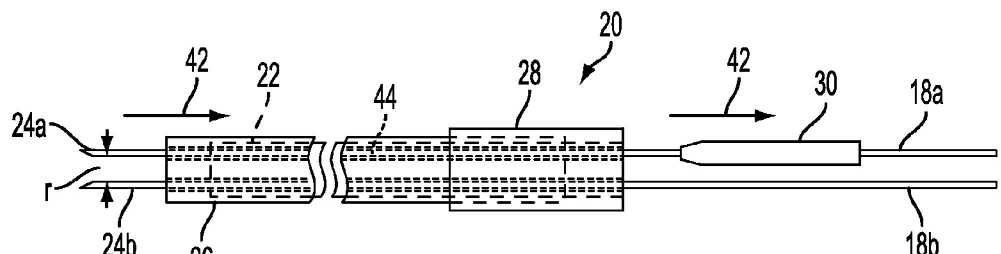

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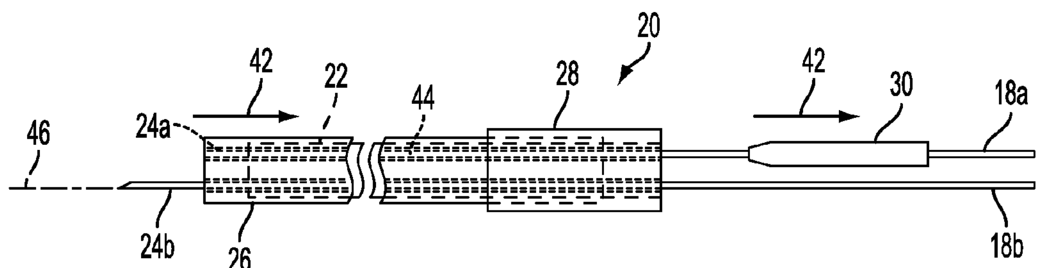

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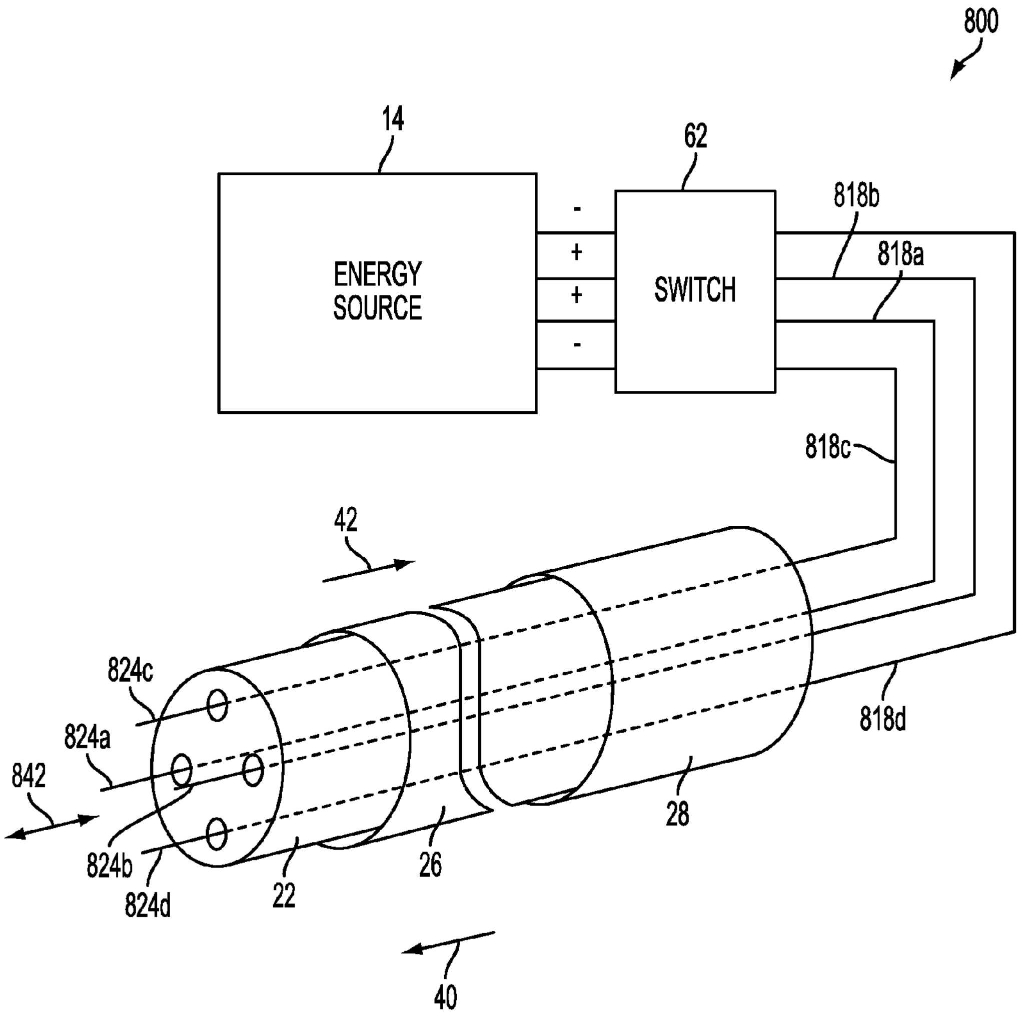
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FIG. 3

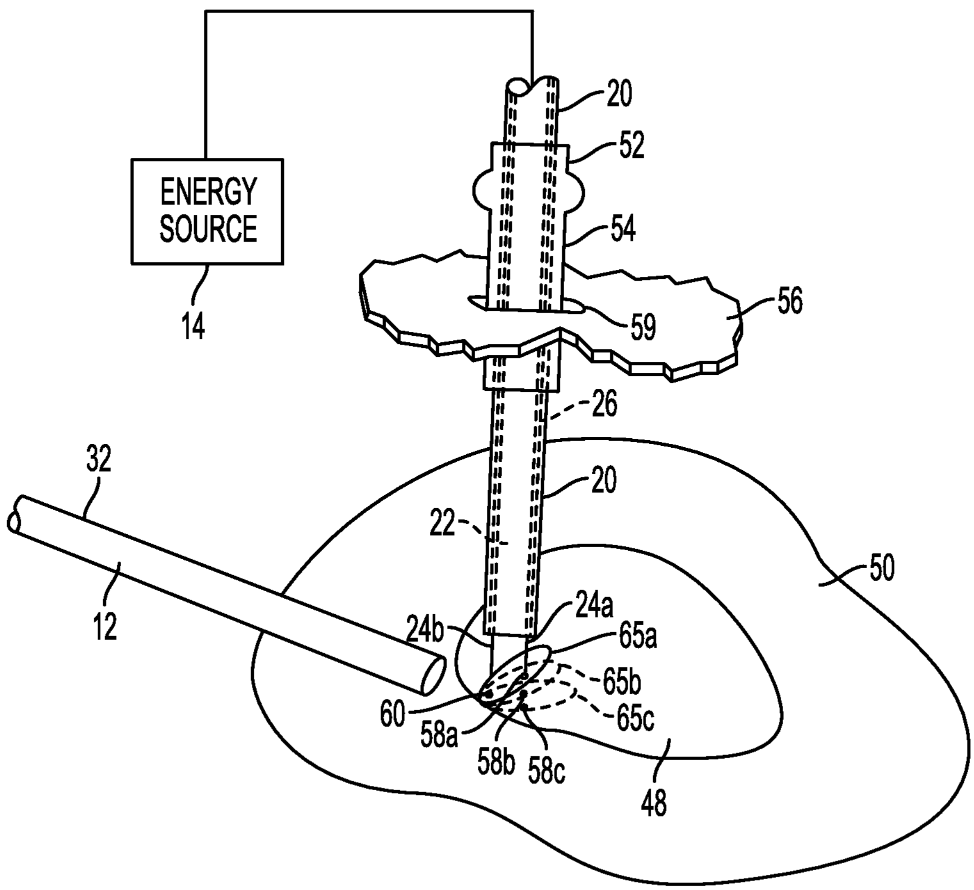
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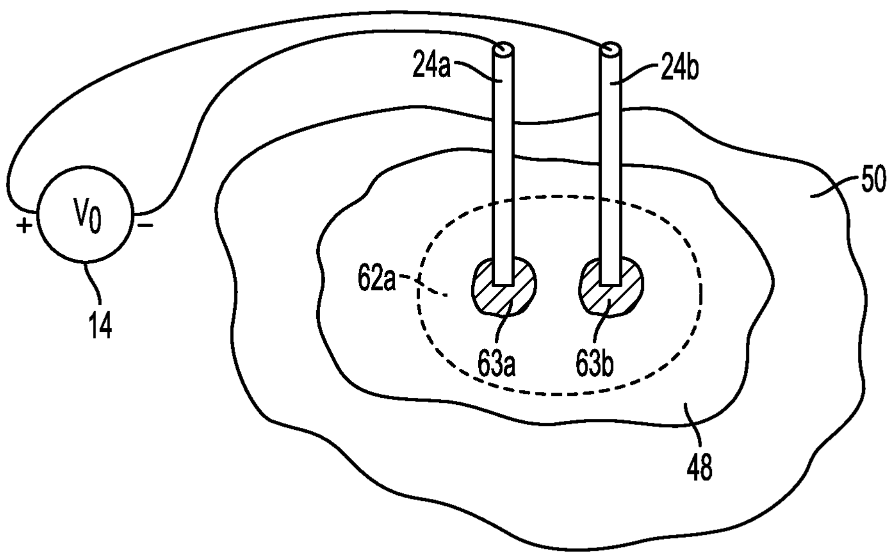
FIG. 4



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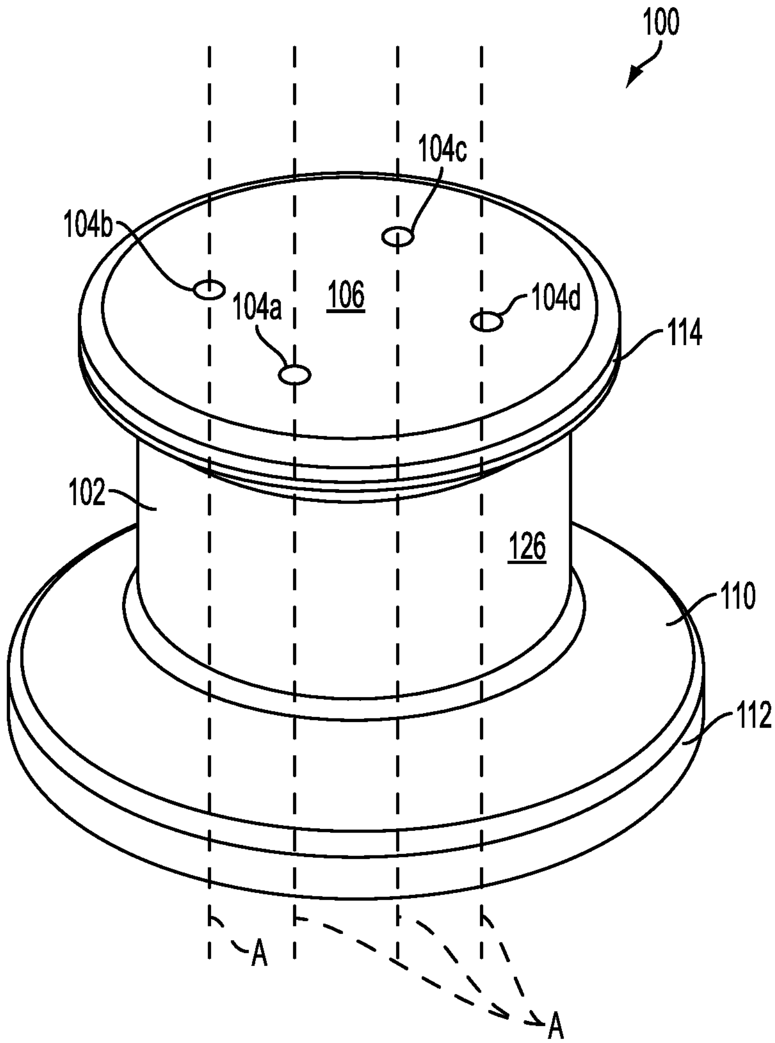

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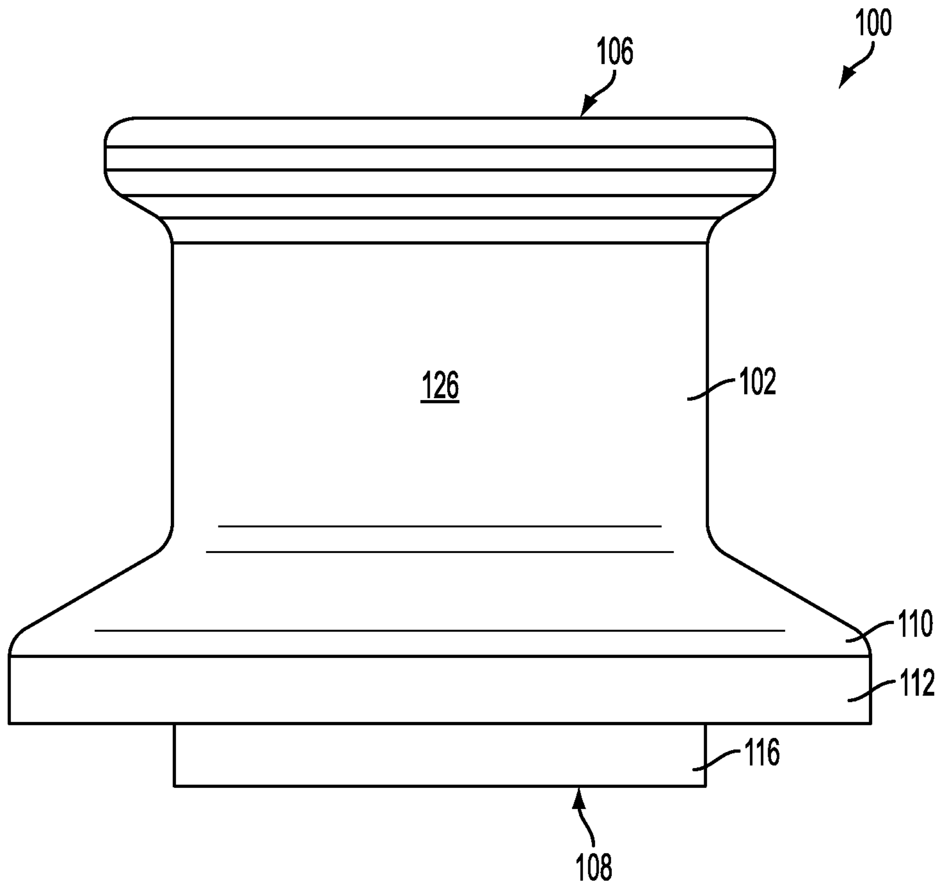

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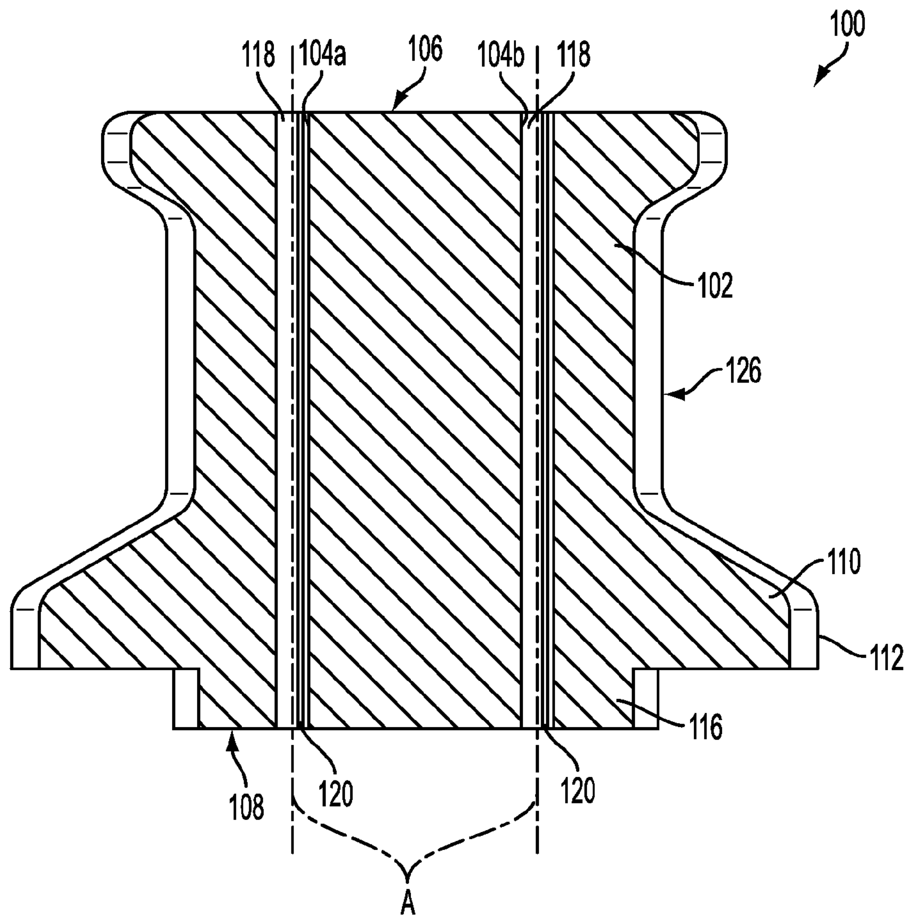

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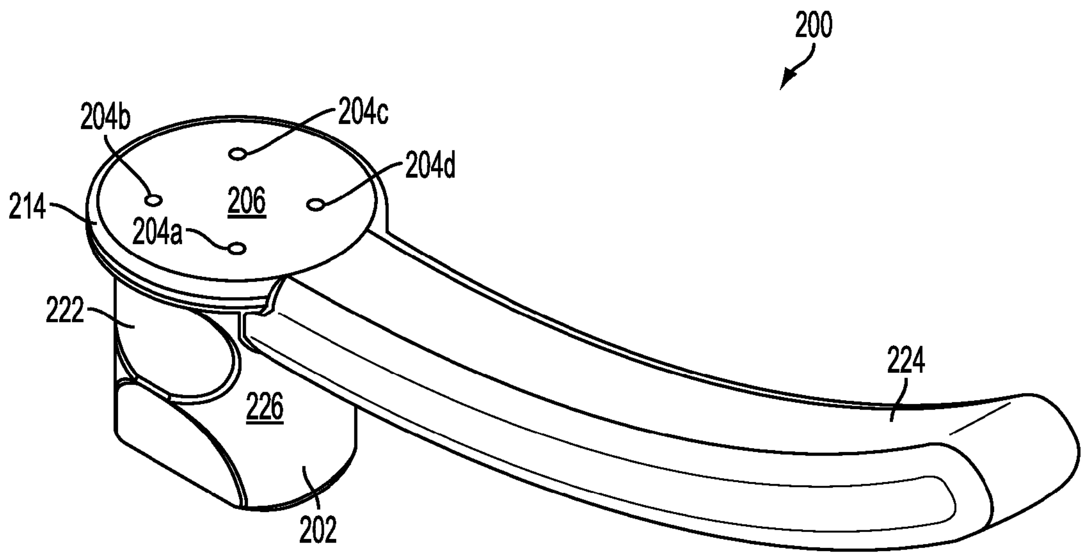

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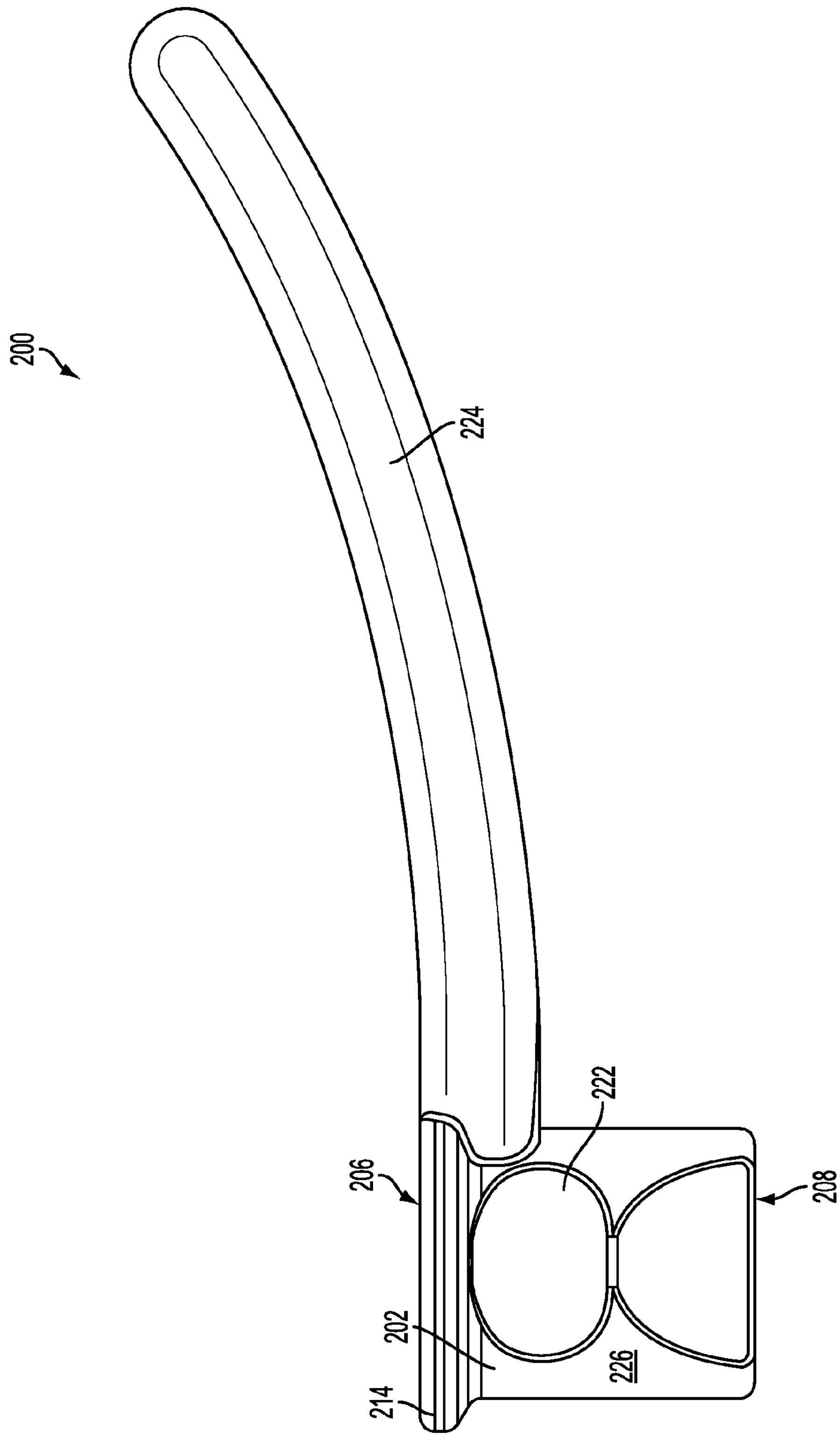

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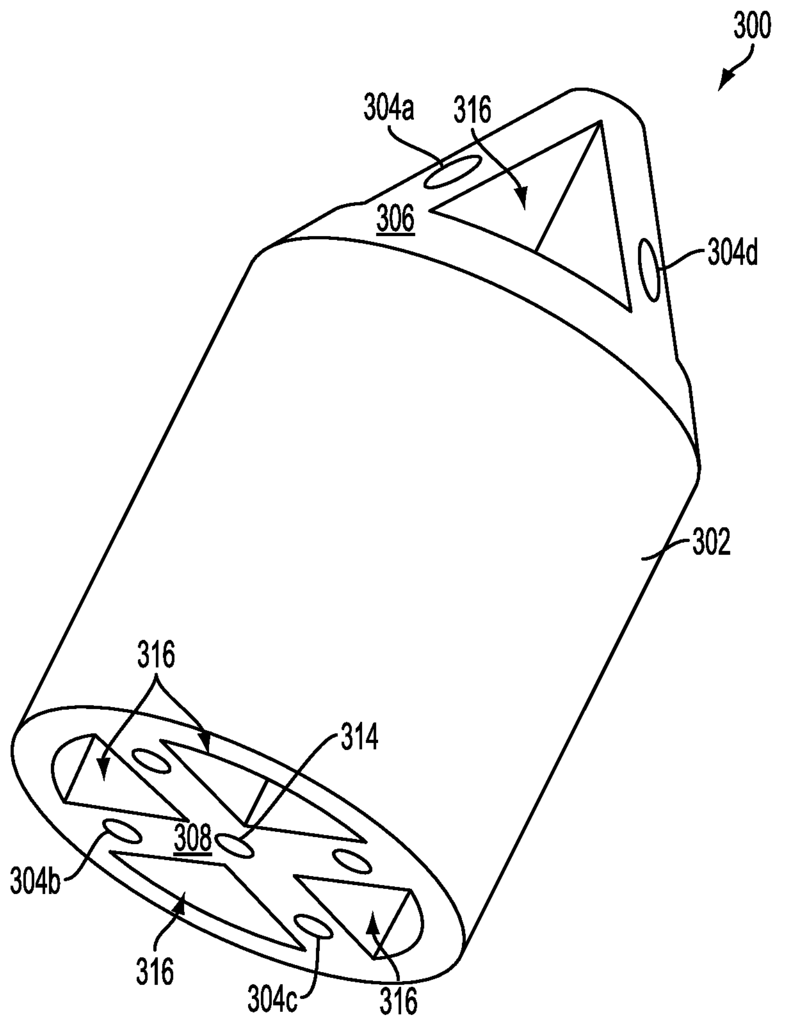

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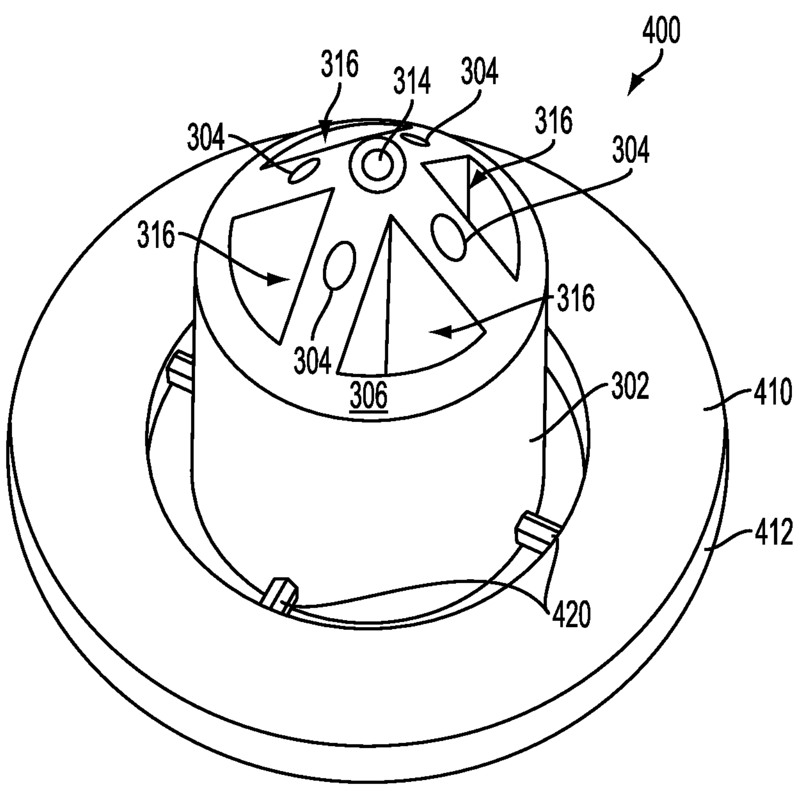

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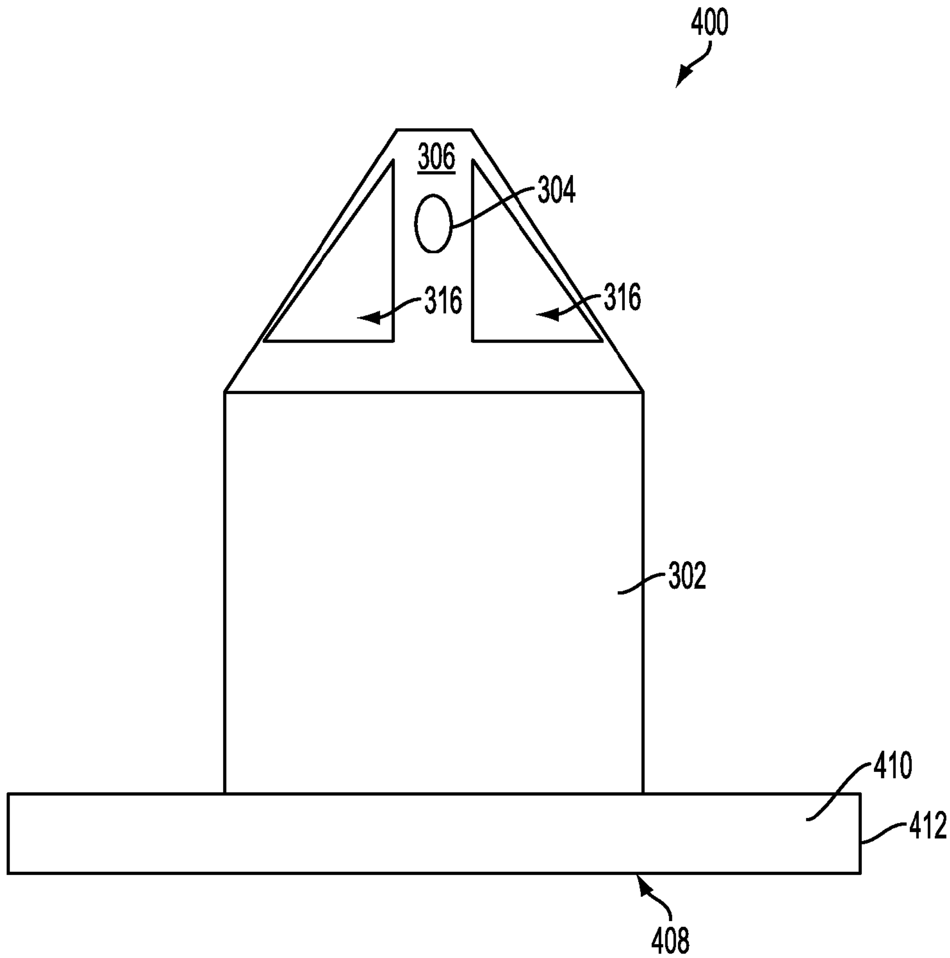

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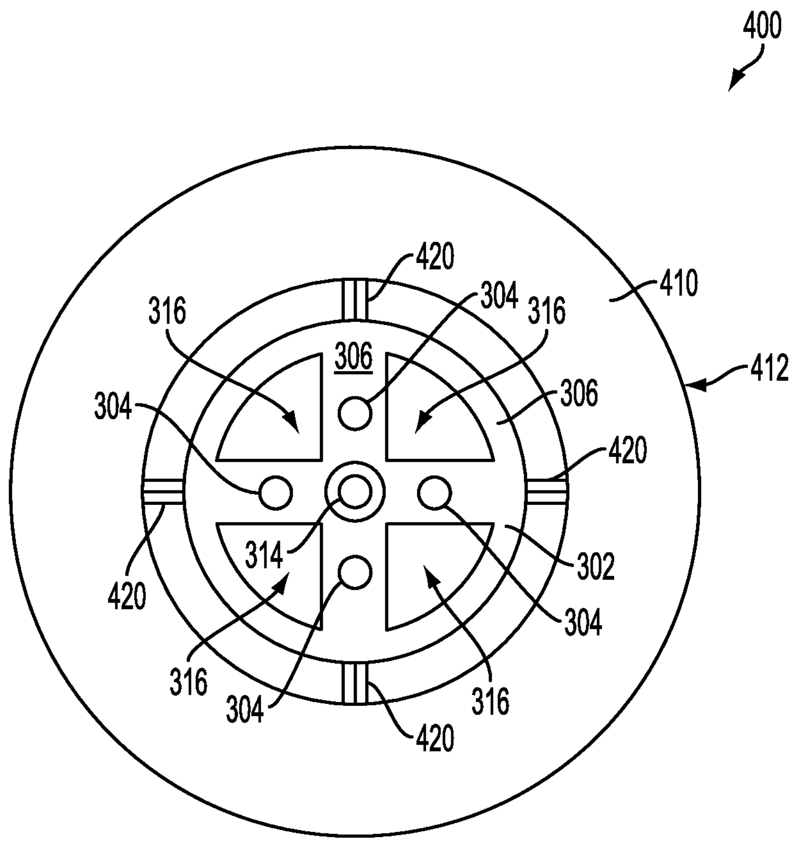
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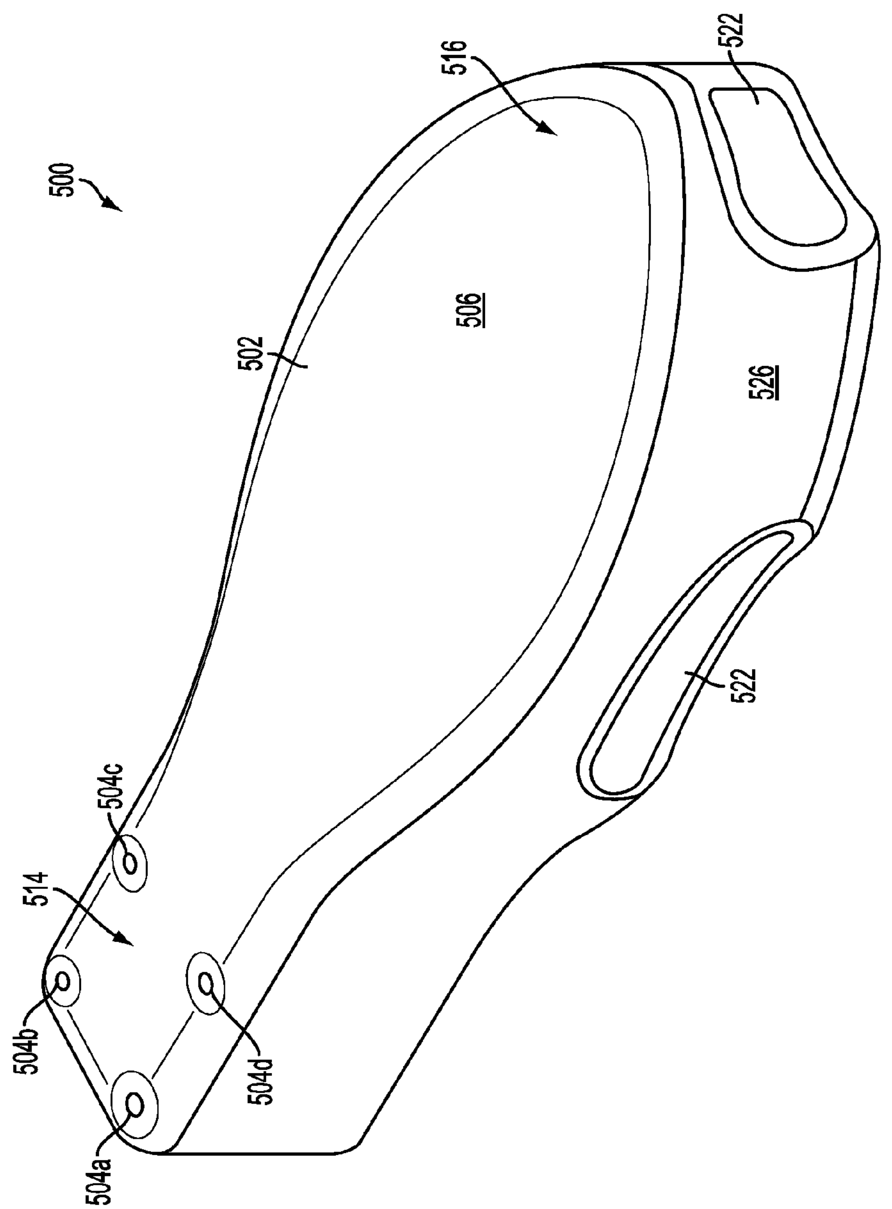
FIG. 14



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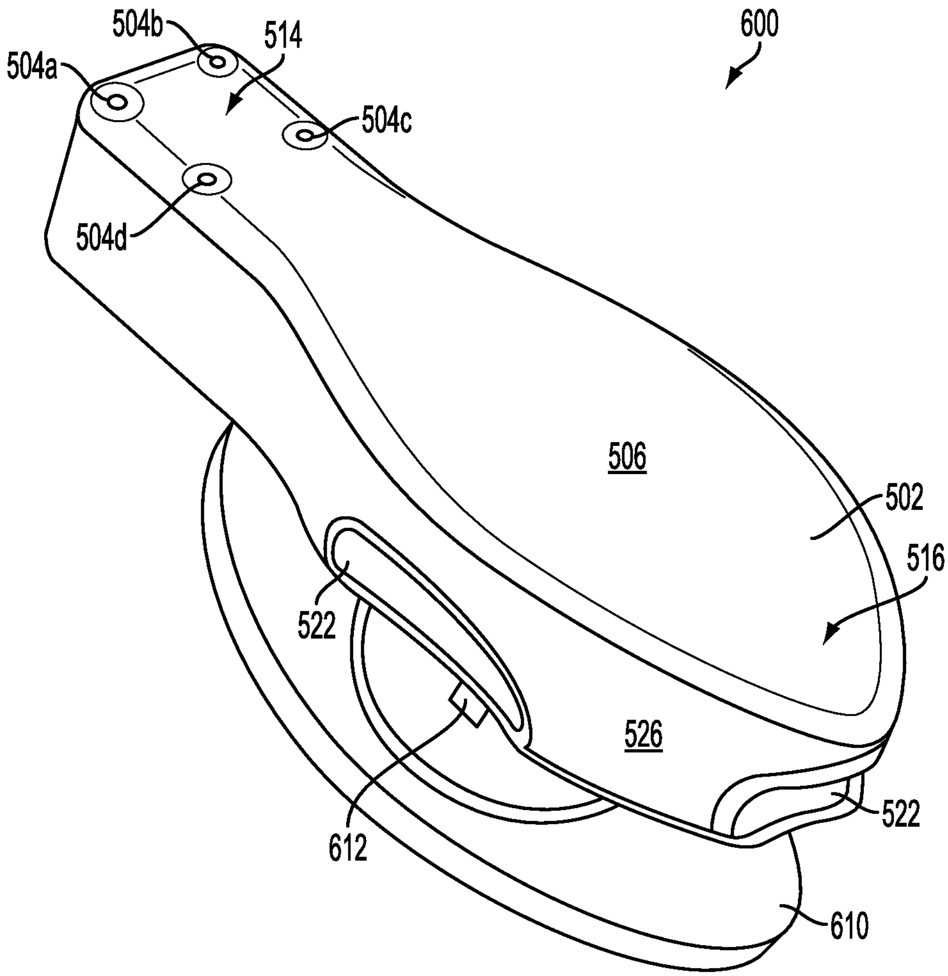

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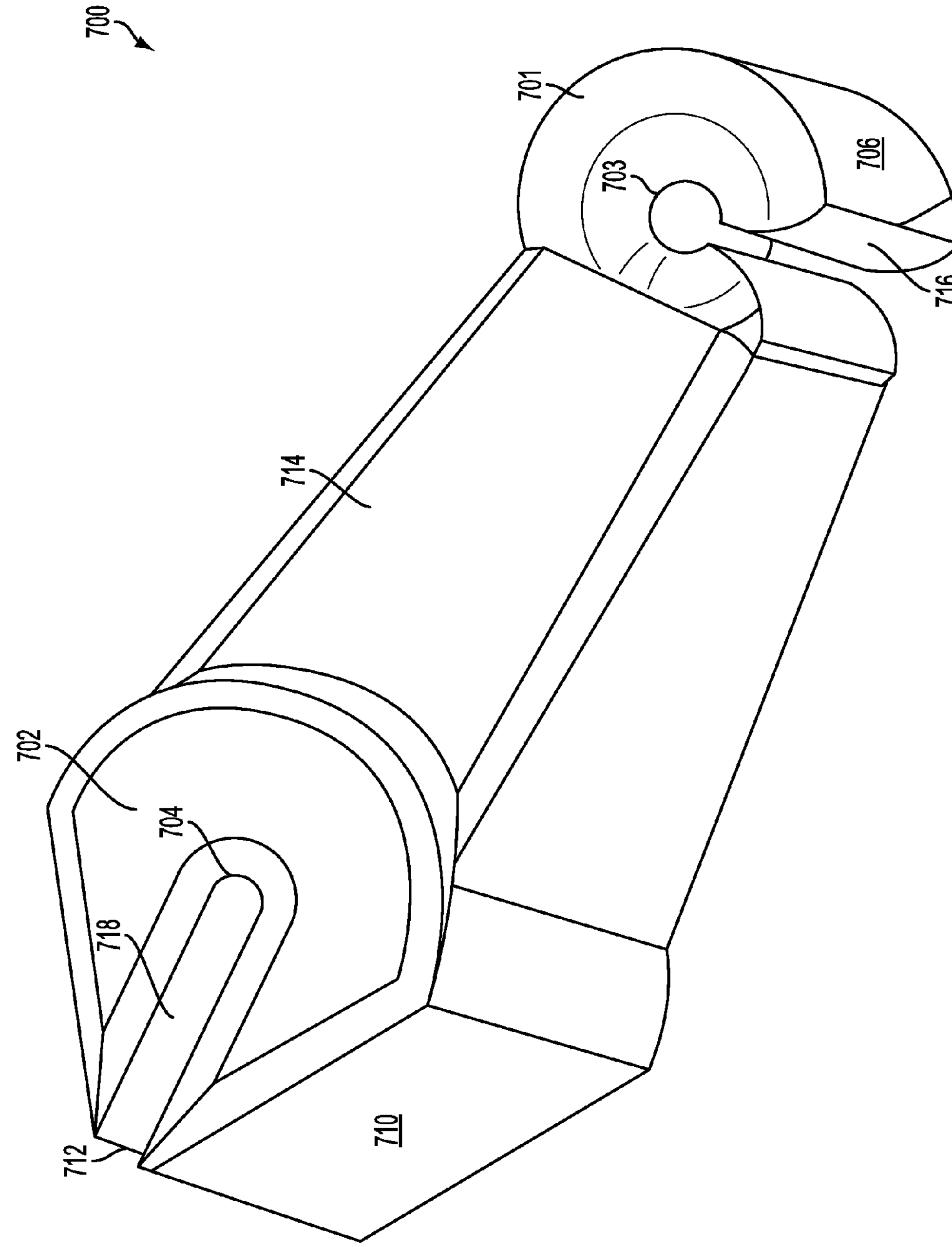

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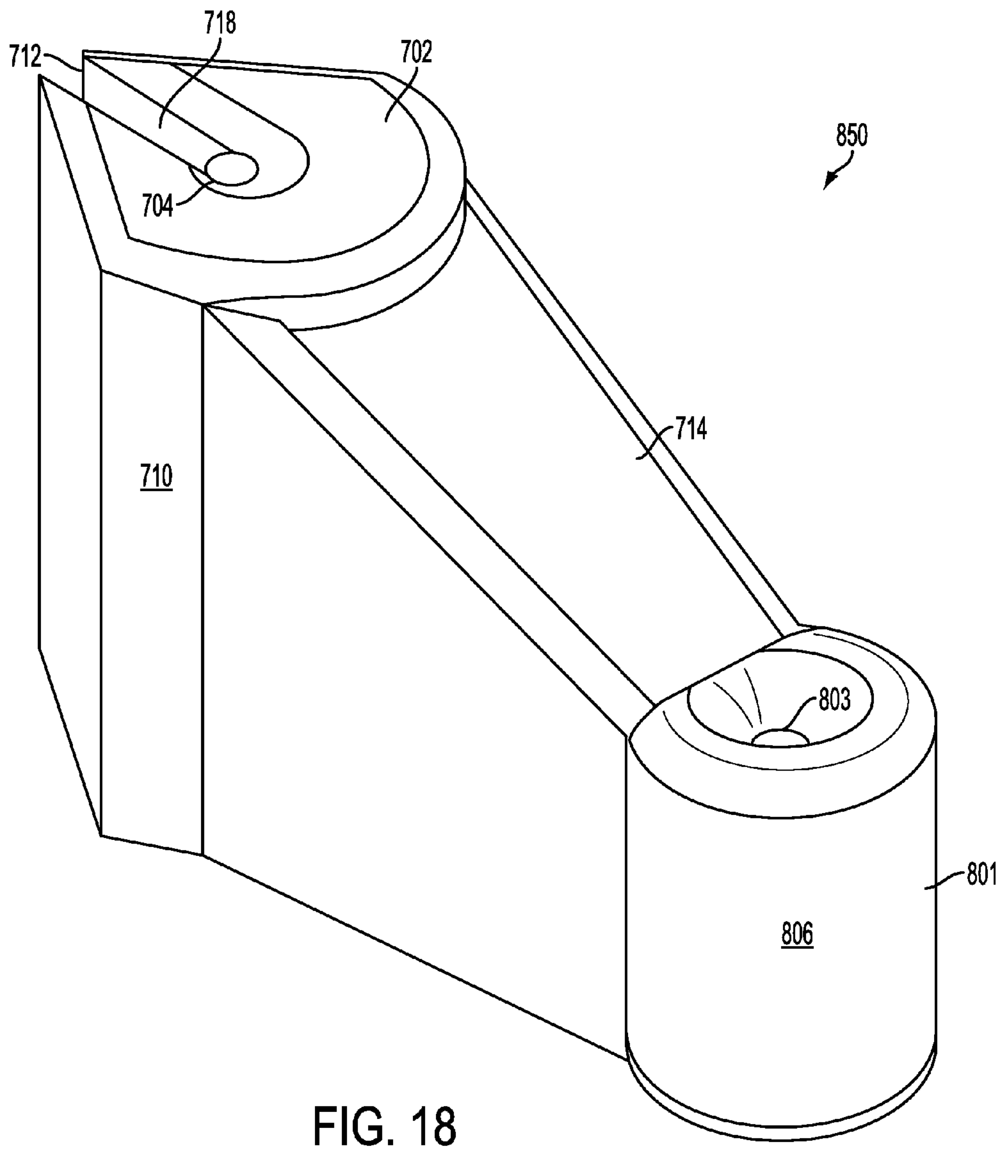


FIG. 18

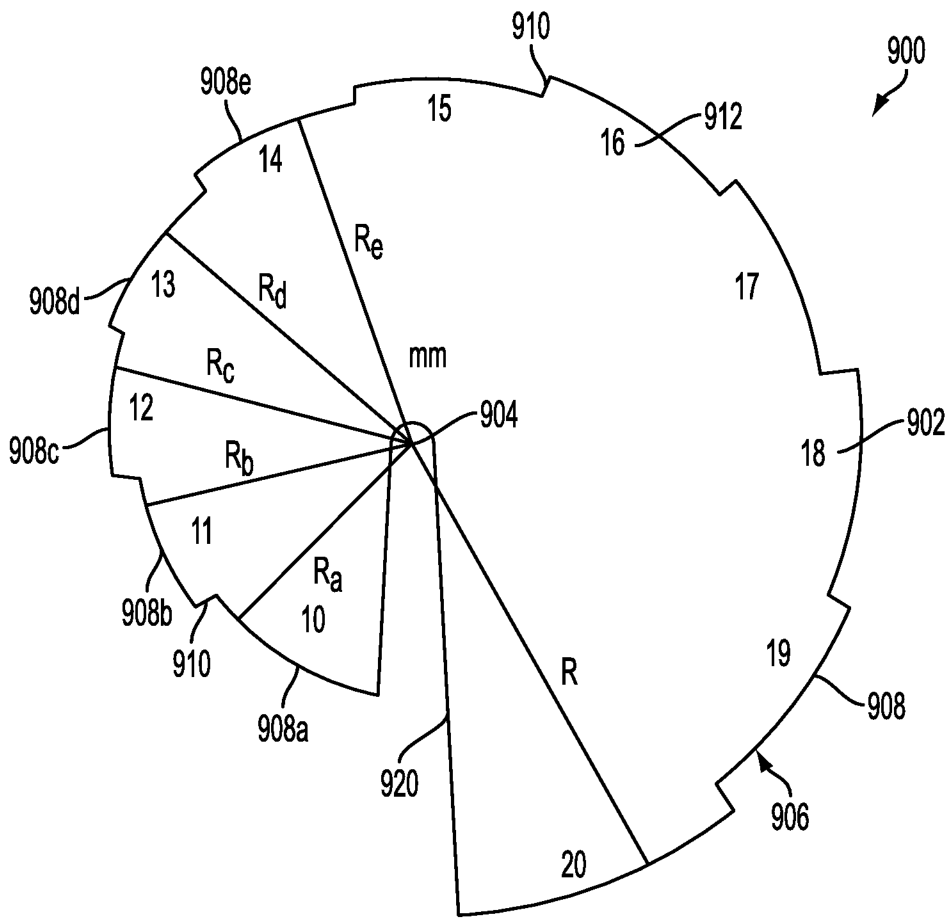

910
900
908e
15
912
16
14
R_e
13
R_d
17
908d
mm
R_c
904
12
902
18
908c
R_b
11
R_a
908b
10
910
19
R
908
908a
920
906
20

FIG. 19

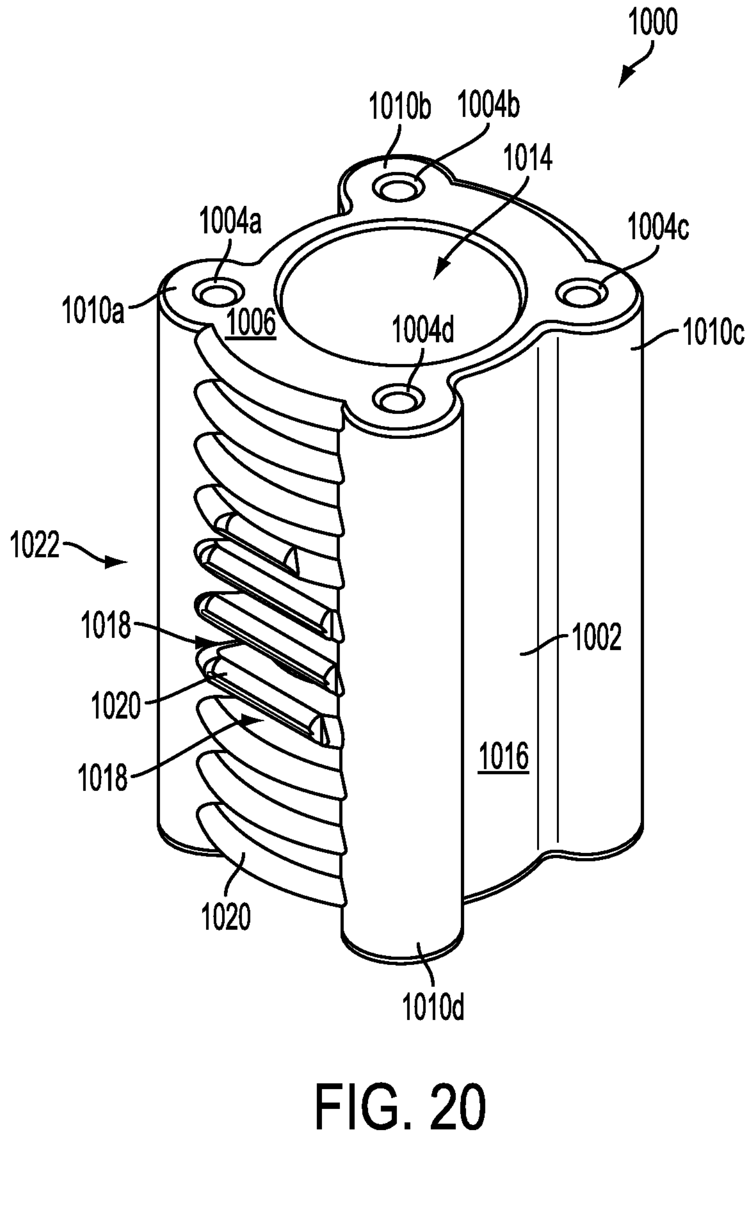

1000
1010b
1004b
1014
1004a
1004c
1010a
1006
1004d
1010c
1022
1018
1002
1020
1018
1016
1020
1010d

FIG. 20

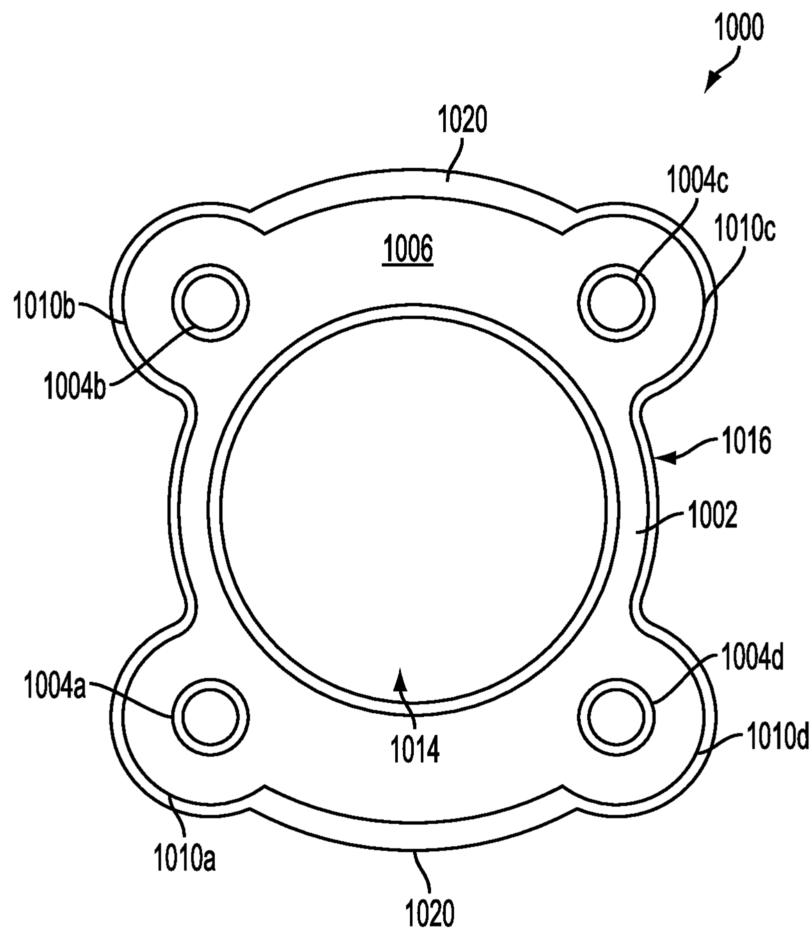
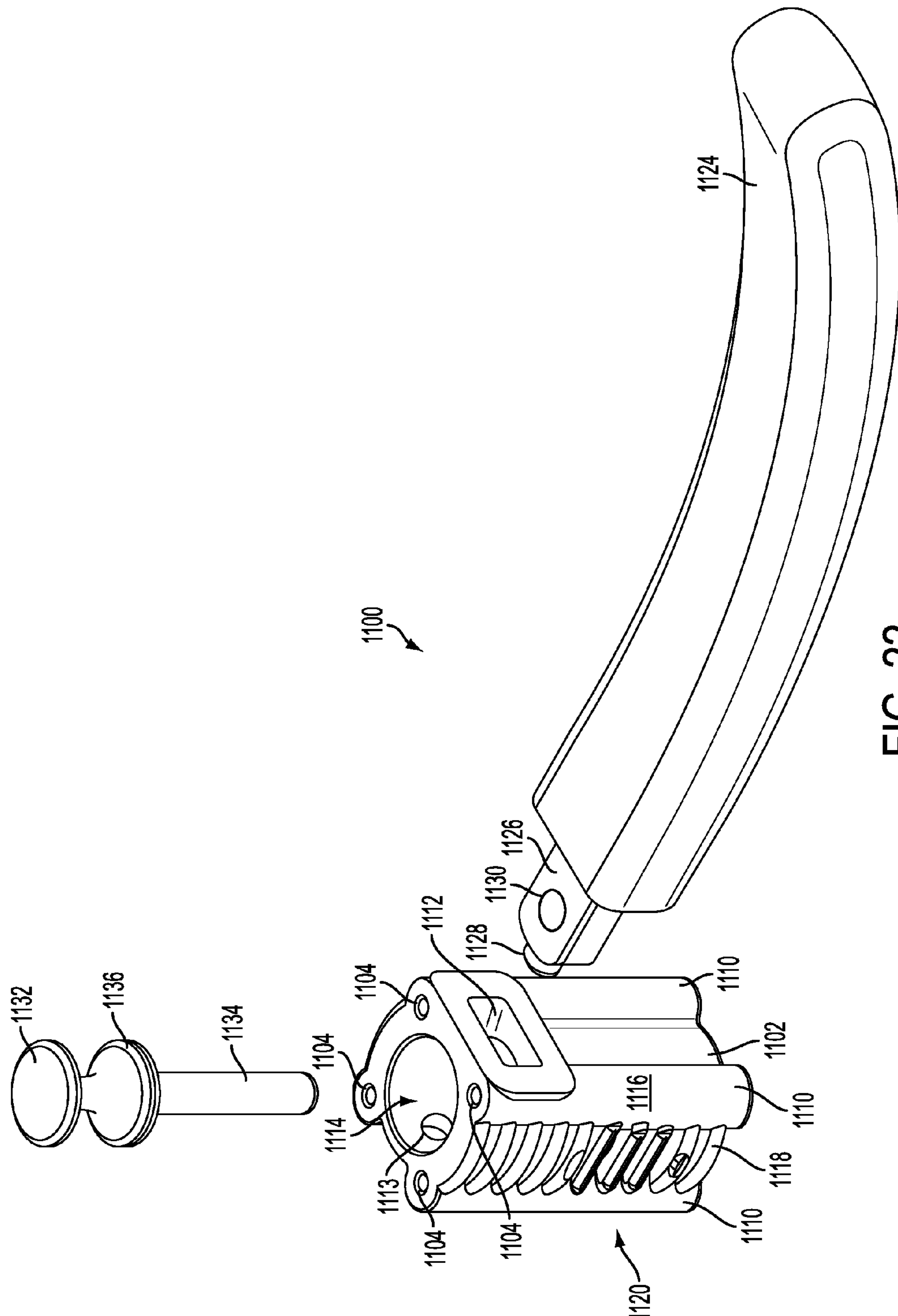

1000
1020
1004c
1010c
1006
1010b
1004b
1016
1002
1004d
1004a
1014
1010d
1010a
1020

FIG. 21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1124
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1130
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1112
1104
1104
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1102
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1116
1118
1110
1114
1113
1104
1104
1120
1132
1136
1134

FIG. 22

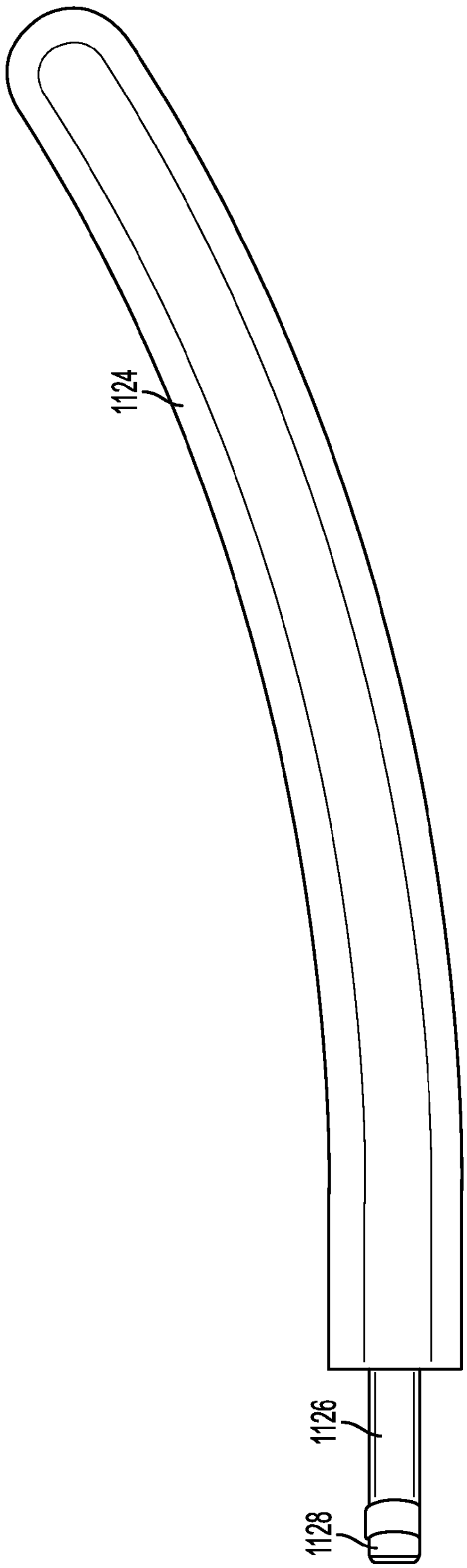


FIG. 23

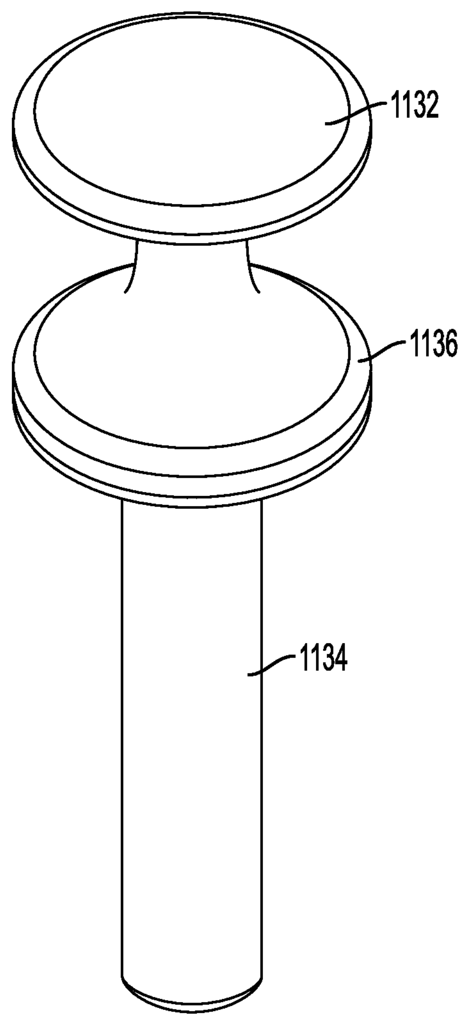


FIG. 24

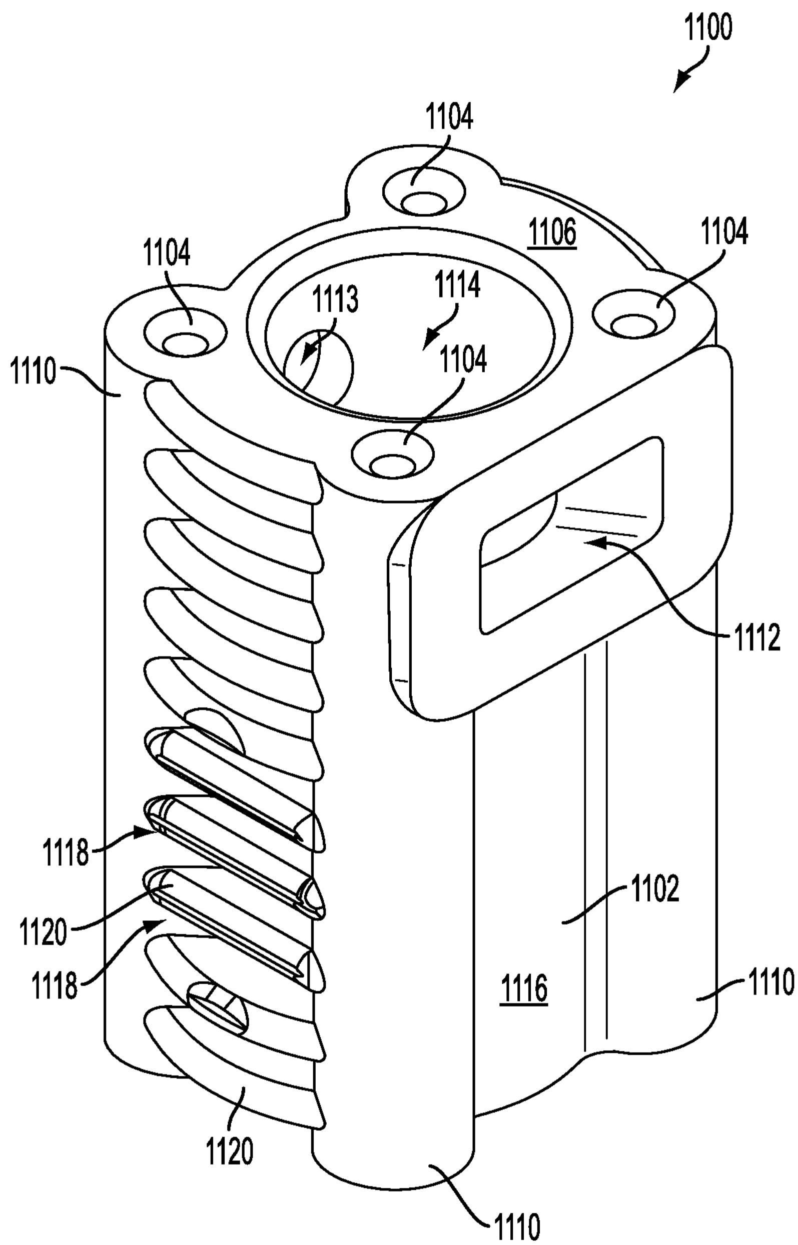
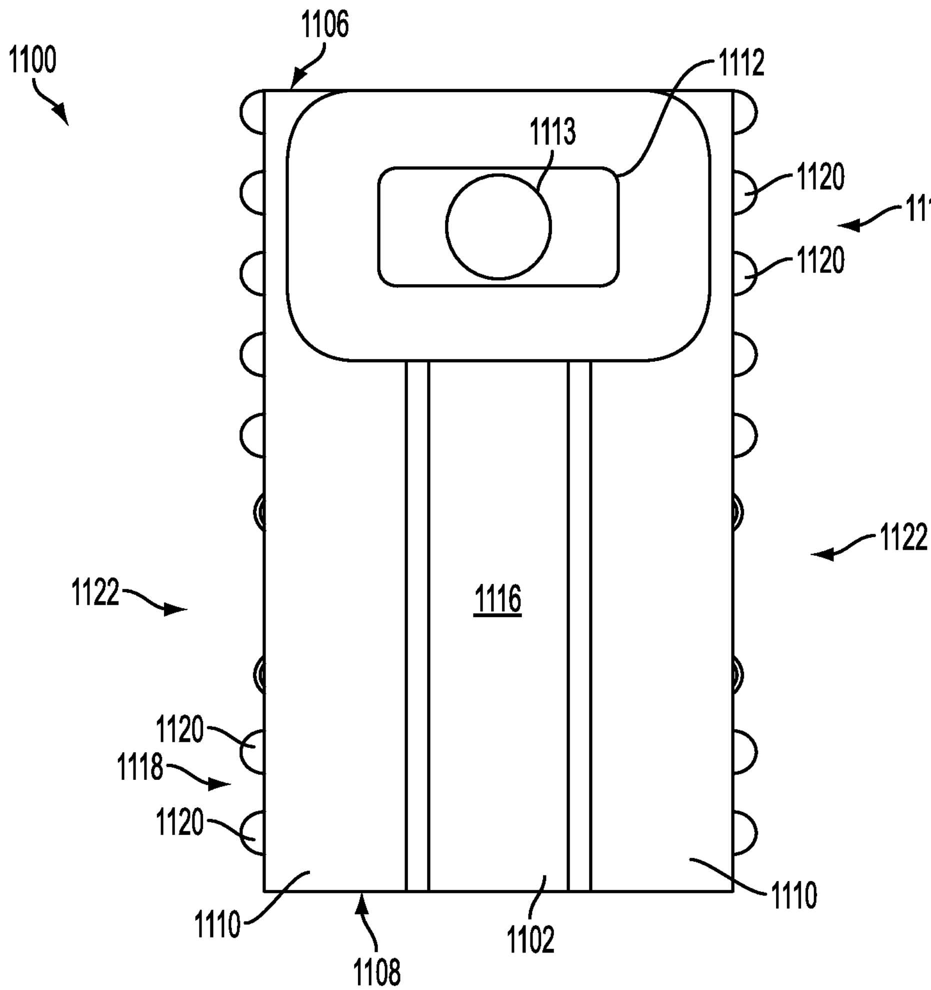

1100
1104
1104
1106
1104
1113
1114
1104
1110
1112
1118
1102
1120
1118
1116
1110
1120
1110

FIG. 25



1100
1106
1112
1113
1120
1118
1120
1122
1122
1116
1120
1118
1120
1110
1110
1108
1102

FIG. 26

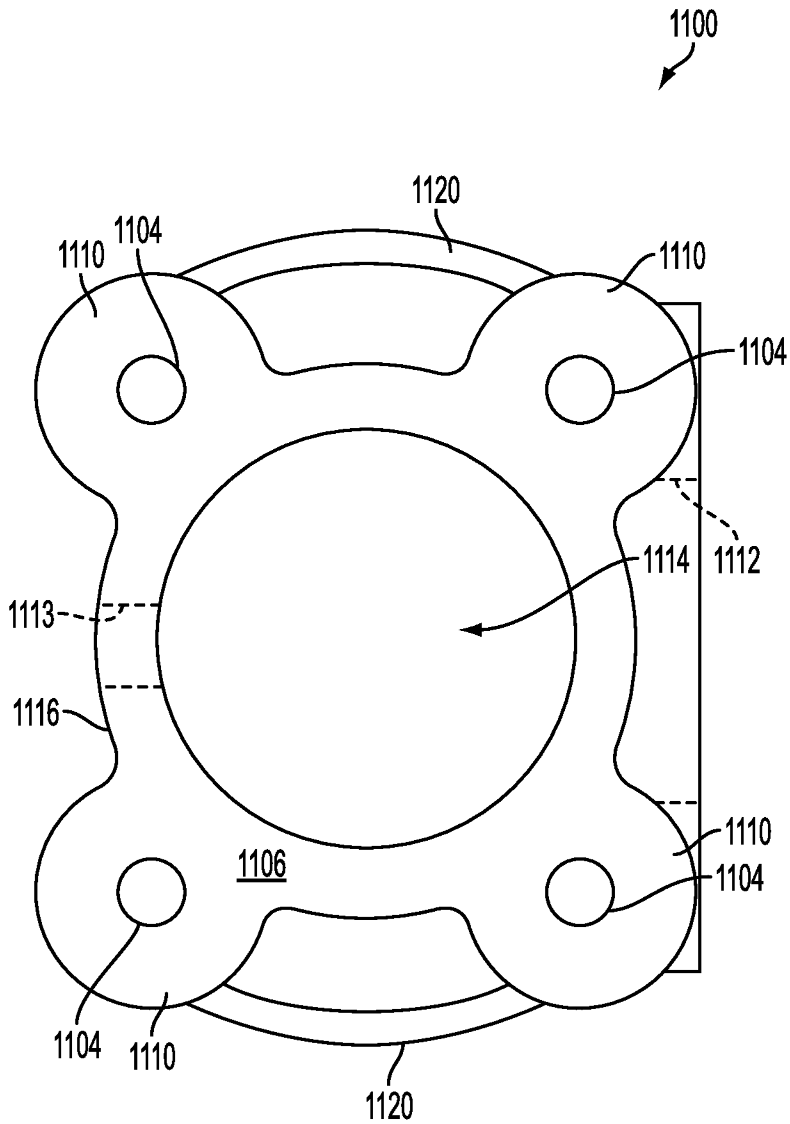

1100
1120
1104
1110
1110
1104
1112
1114
1113
1116
1110
1106
1104
1104
1110
1120

FIG. 27

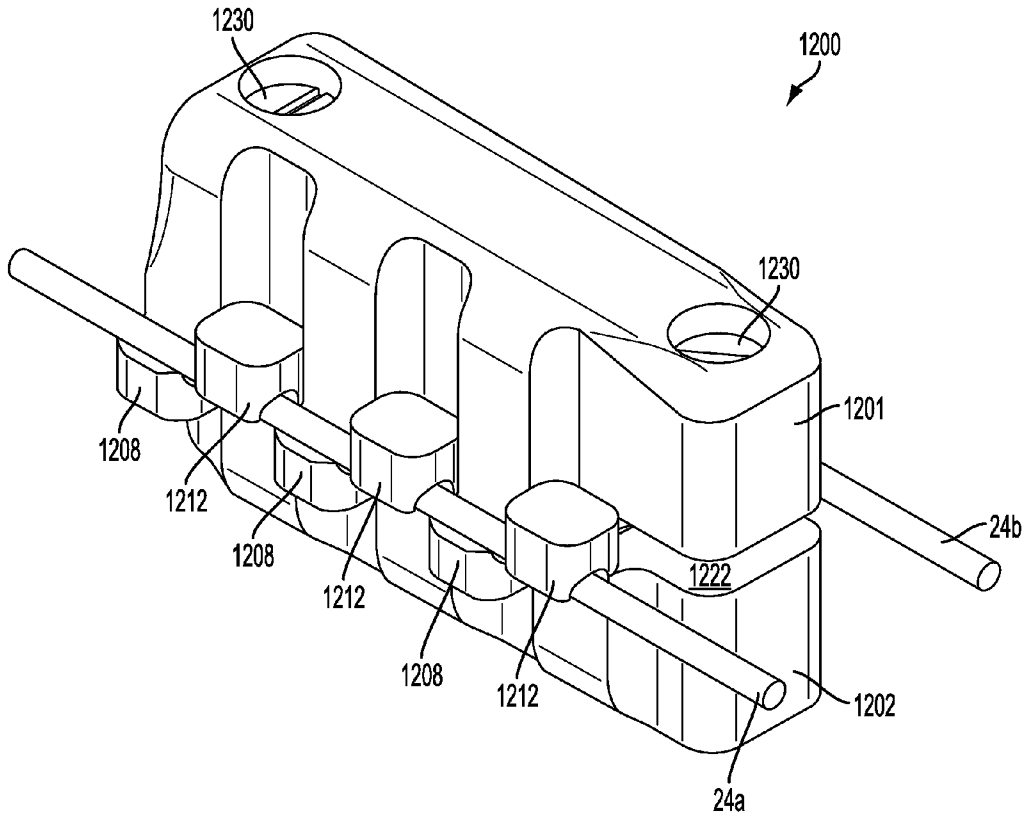

1230
1200
1230
1201
1208
1212
1208
1212
24b
1222
1208
1212
1202
24a

FIG. 28

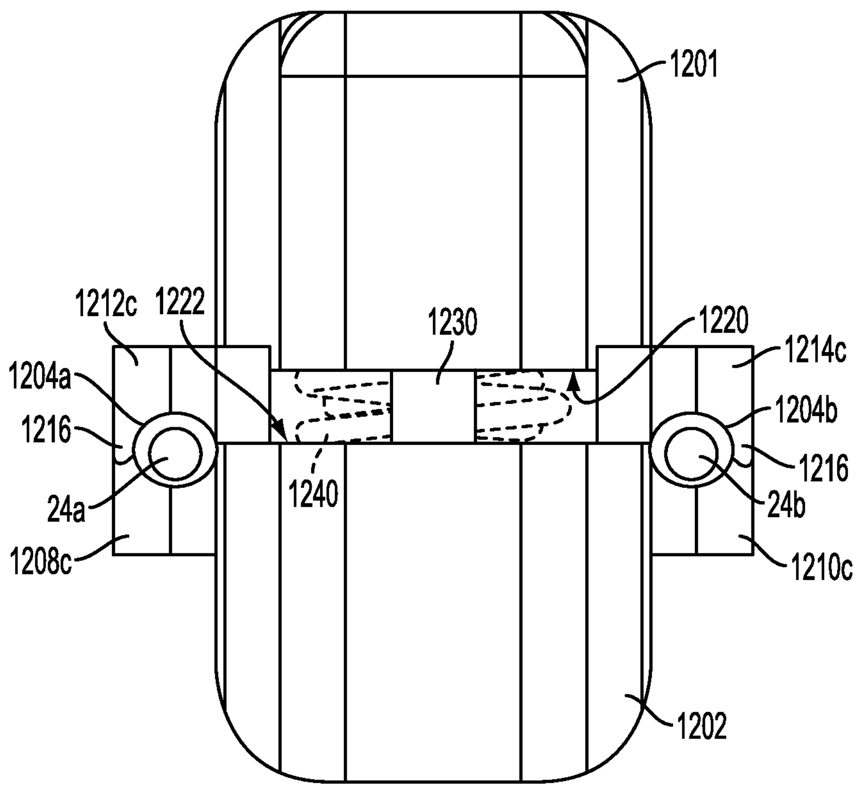

1201
1212c
1222
1230
1220
1214c
1204a
1204b
1216
1216
24a
1240
24b
1208c
1210c
1202

FIG. 29

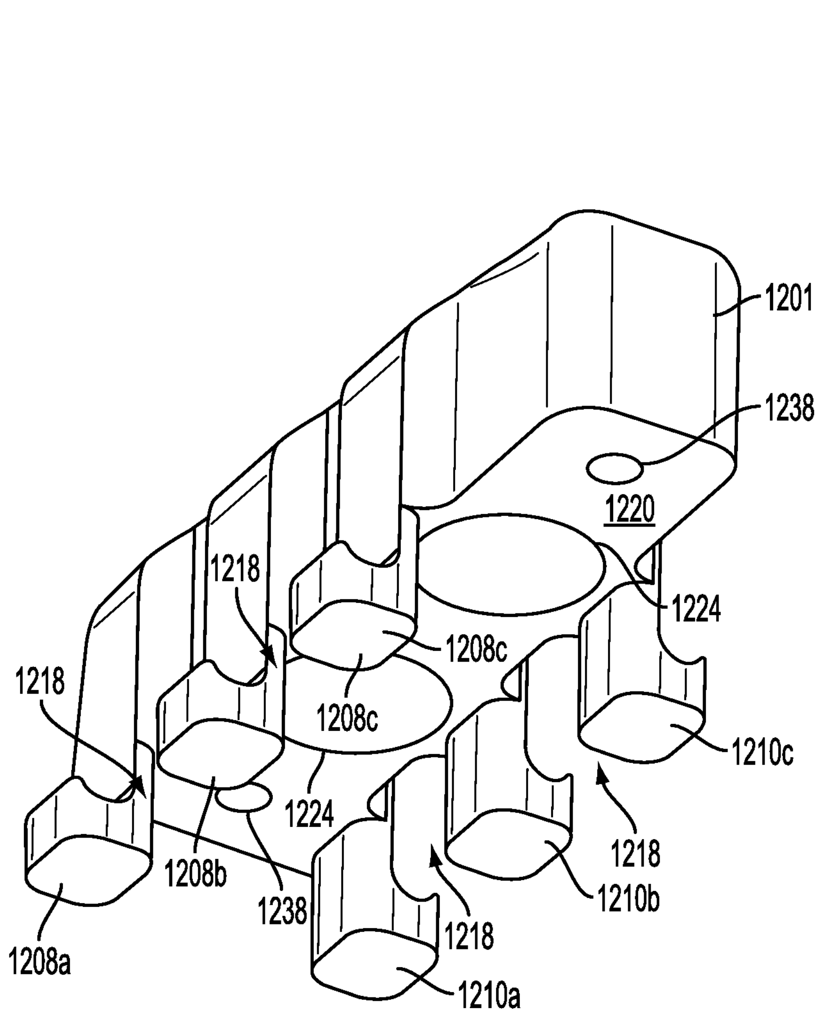

1200
1201
1238
1220
1224
1218
1208c
1208c
1218
1210c
1224
1208b
1238
1218
1210b
1218
1208a
1210a

FIG. 30

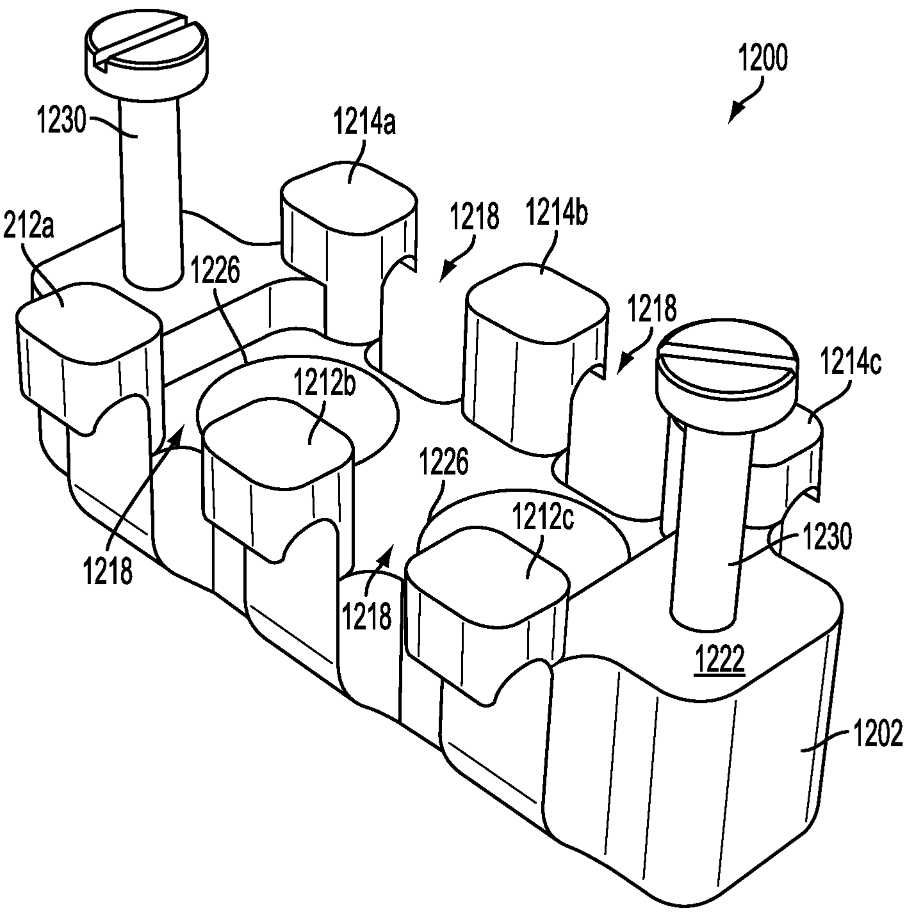

1200
1230
1214a
1212a
1218
1214b
1226
1218
1212b
1214c
1226
1212c
1230
1218
1218
1222
1202

FIG. 31

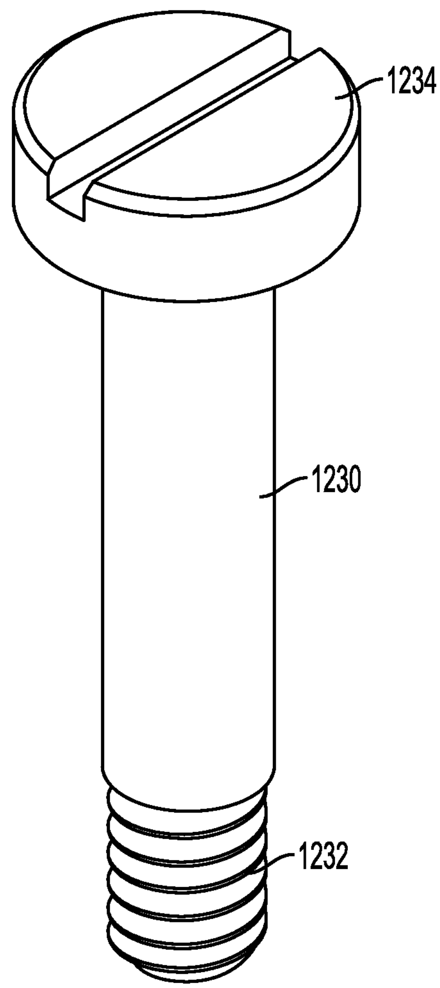
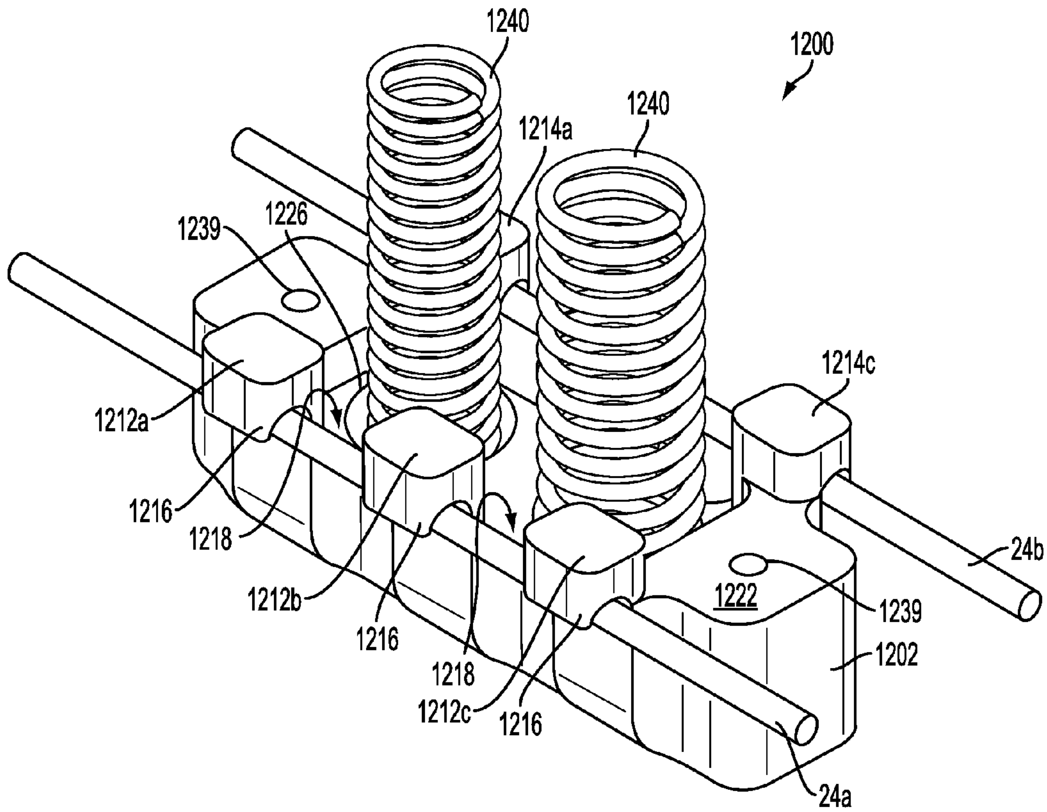


FIG. 32



1240
1200
1240
1214a
1239
1226
1214c
1212a
1216
1218
1212b
1216
1218
1212c
1216
1222
1239
24b
1202
24a

FIG. 33

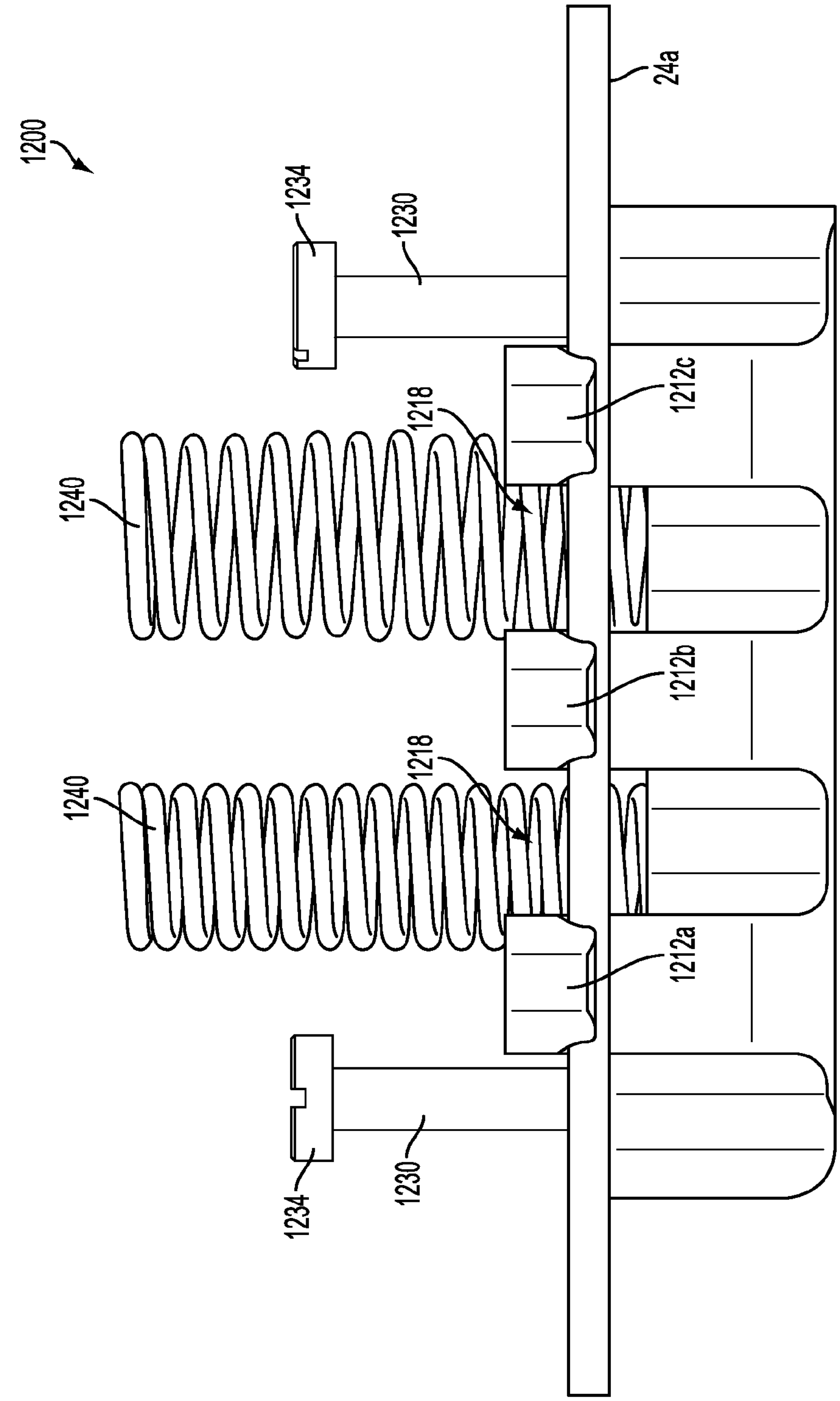

1200
24a
1234
1230
1240
1218
1212c
1240
1212b
1218
1212a
1234
1230

FIG. 34

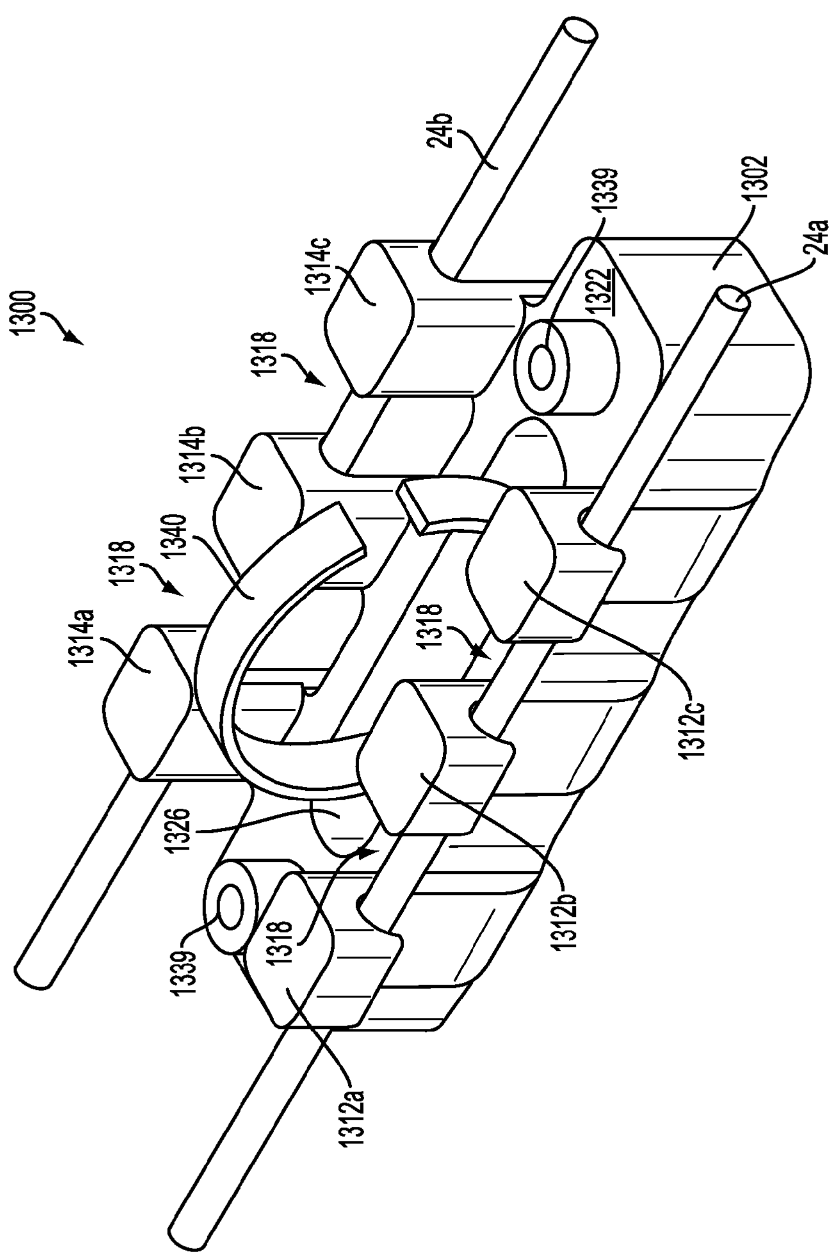

1300
24b
1339
1302
24a
1322
1314c
1318
1314b
1340
1318
1314a
1318
1312c
1326
1339
1318
1312b
1312a

FIG. 35

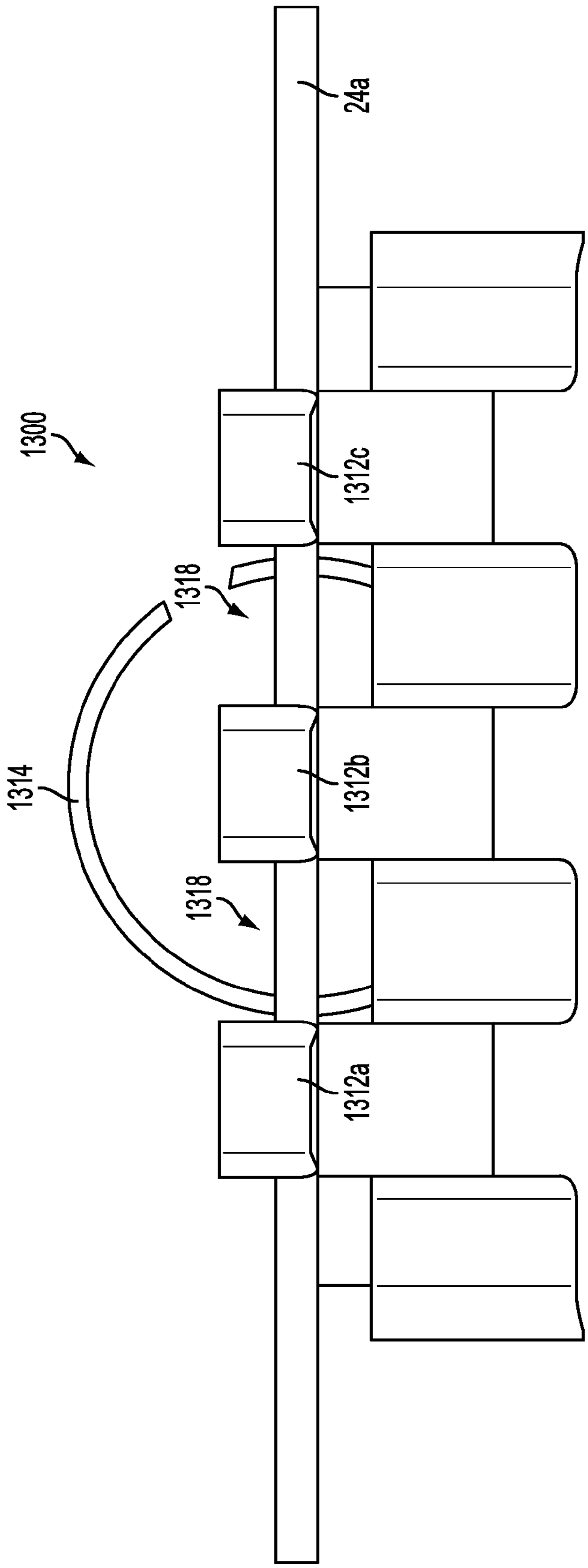


FIG. 36

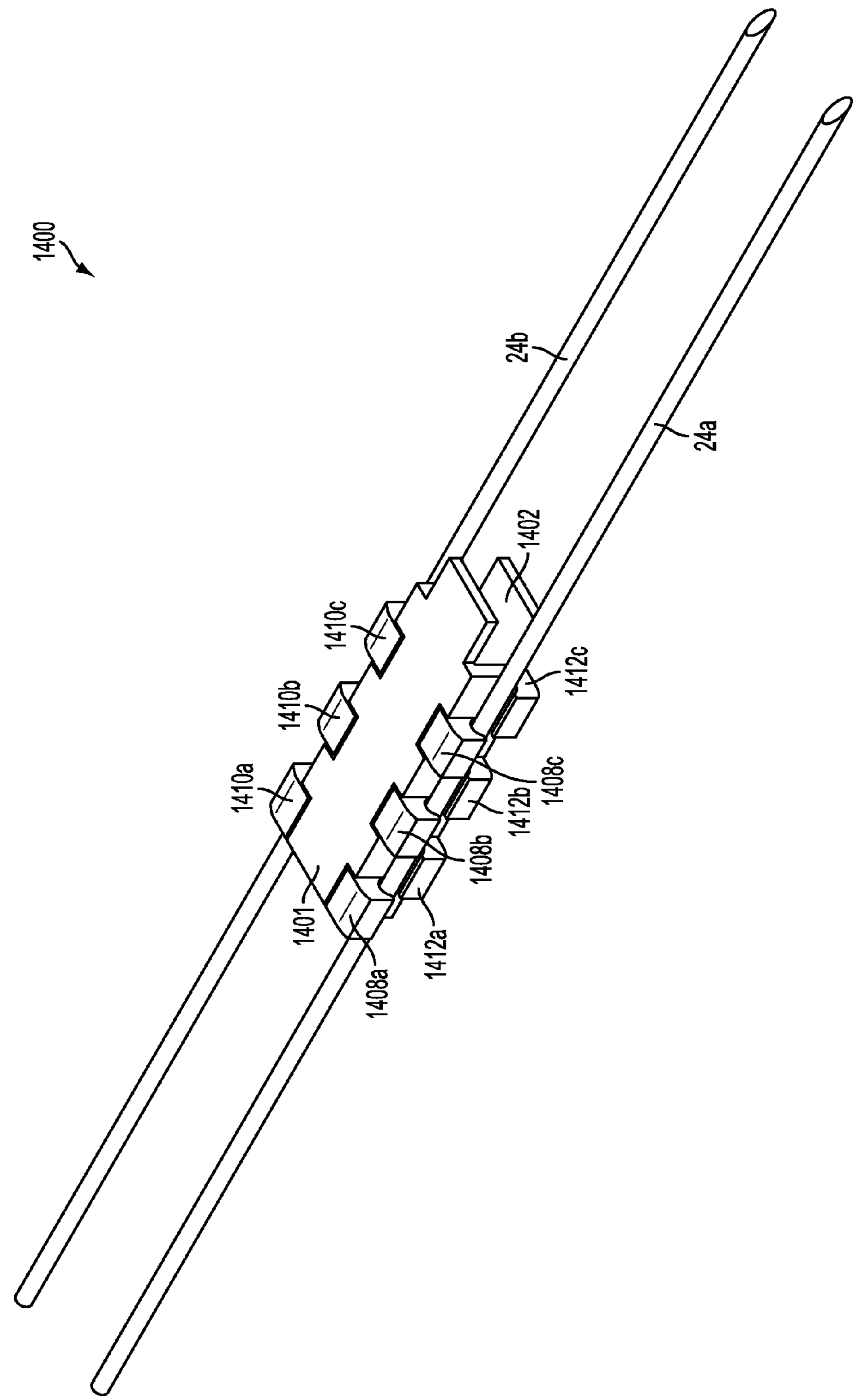

1400
24b
24a
1402
1410c
1410b
1410a
1412c
1408c
1412b
1408b
1401
1412a
1408a

FIG. 37

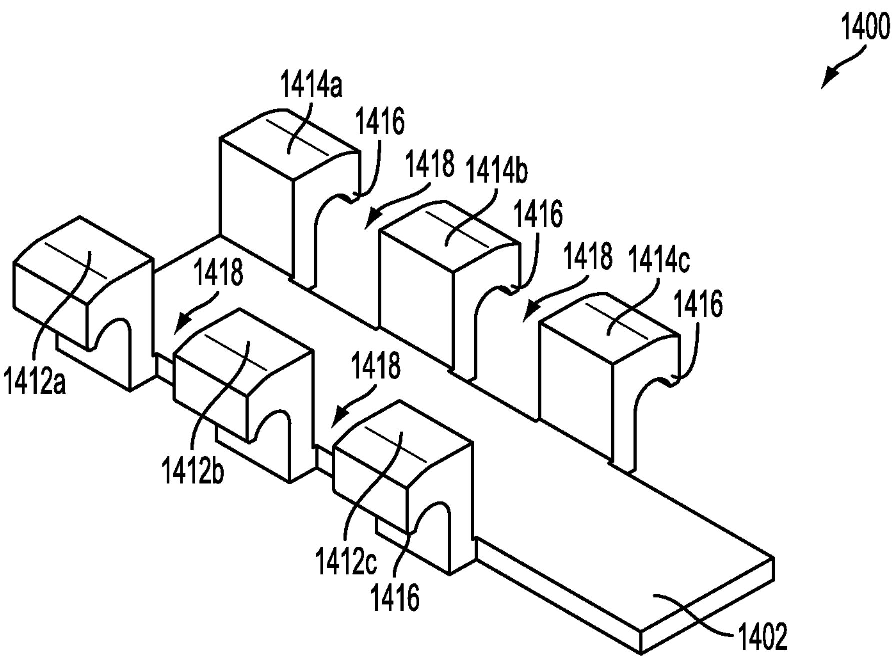

1400
1414a
1416
1418
1414b
1416
1418
1414c
1416
1418
1412a
1418
1412b
1412c
1416
1402

FIG. 38

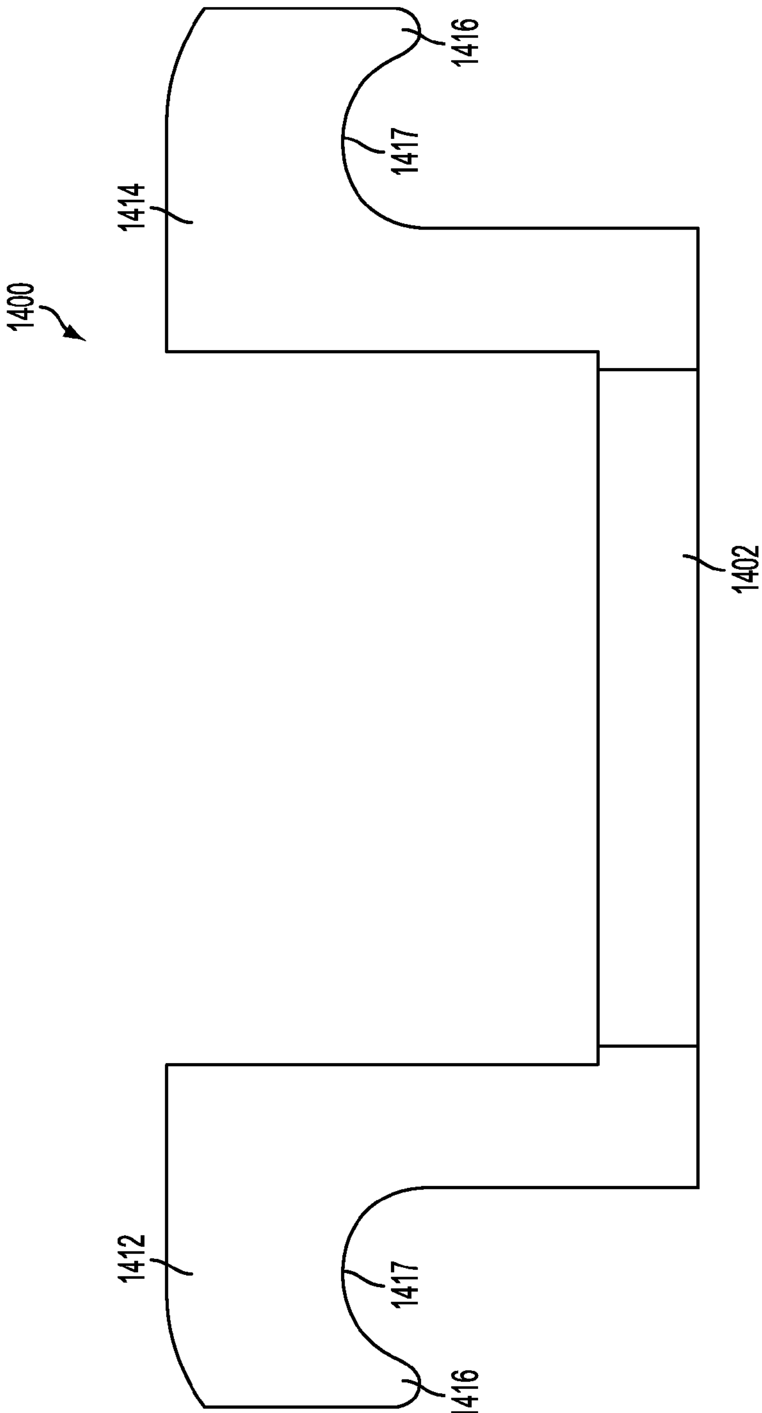


FIG. 39

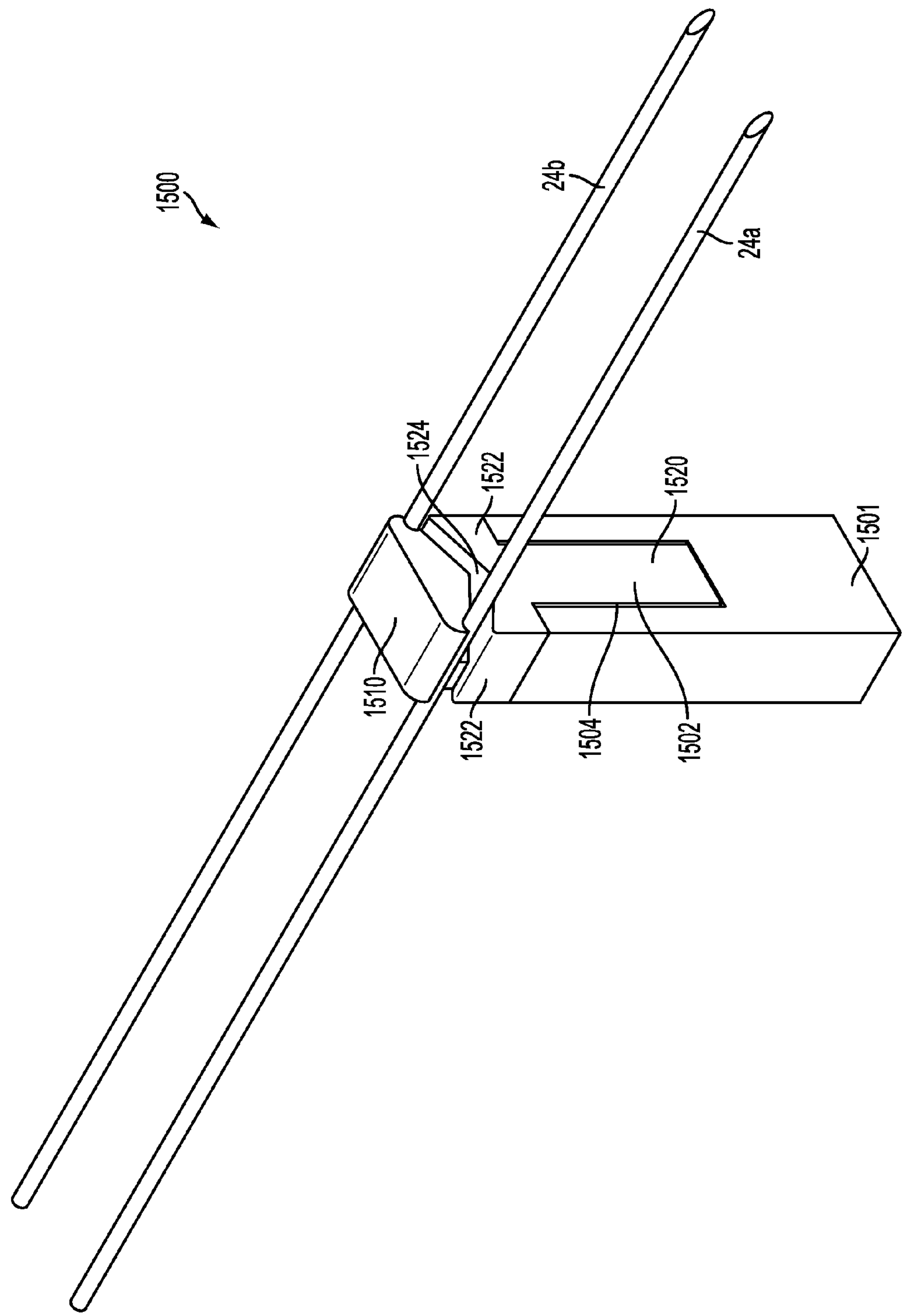


FIG. 40

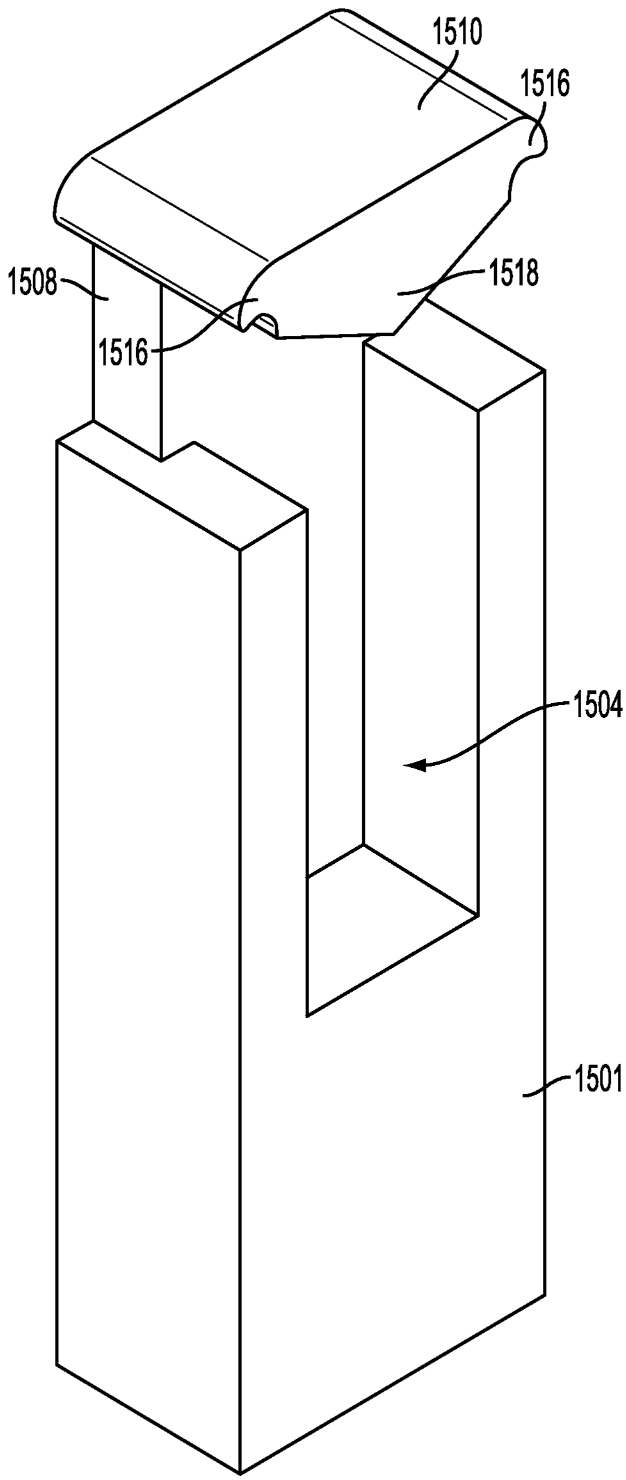


FIG. 41

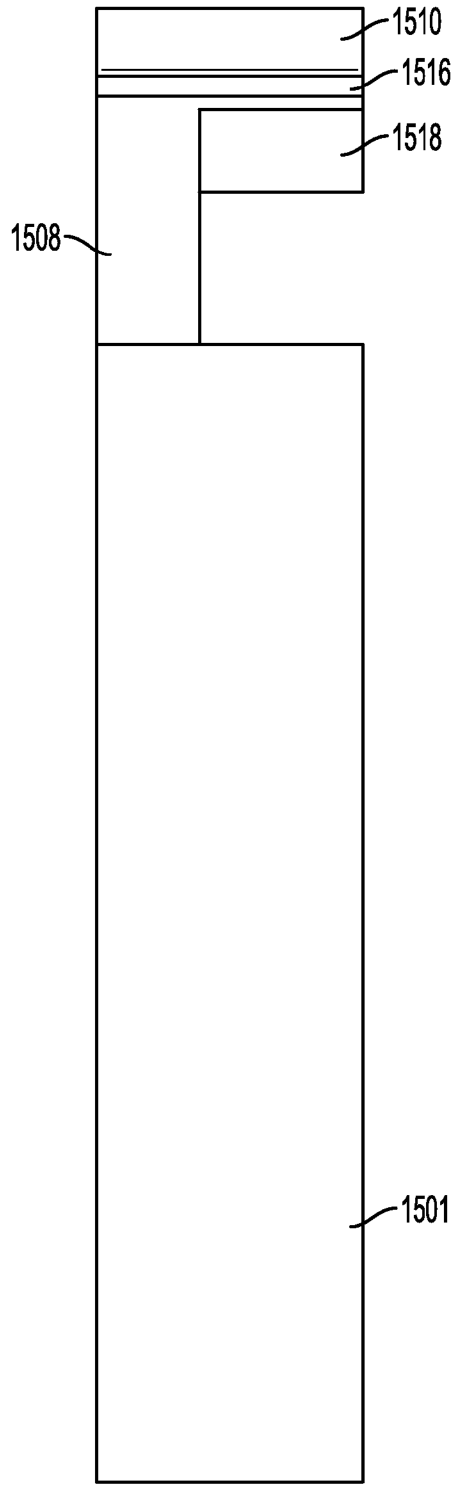


FIG. 42

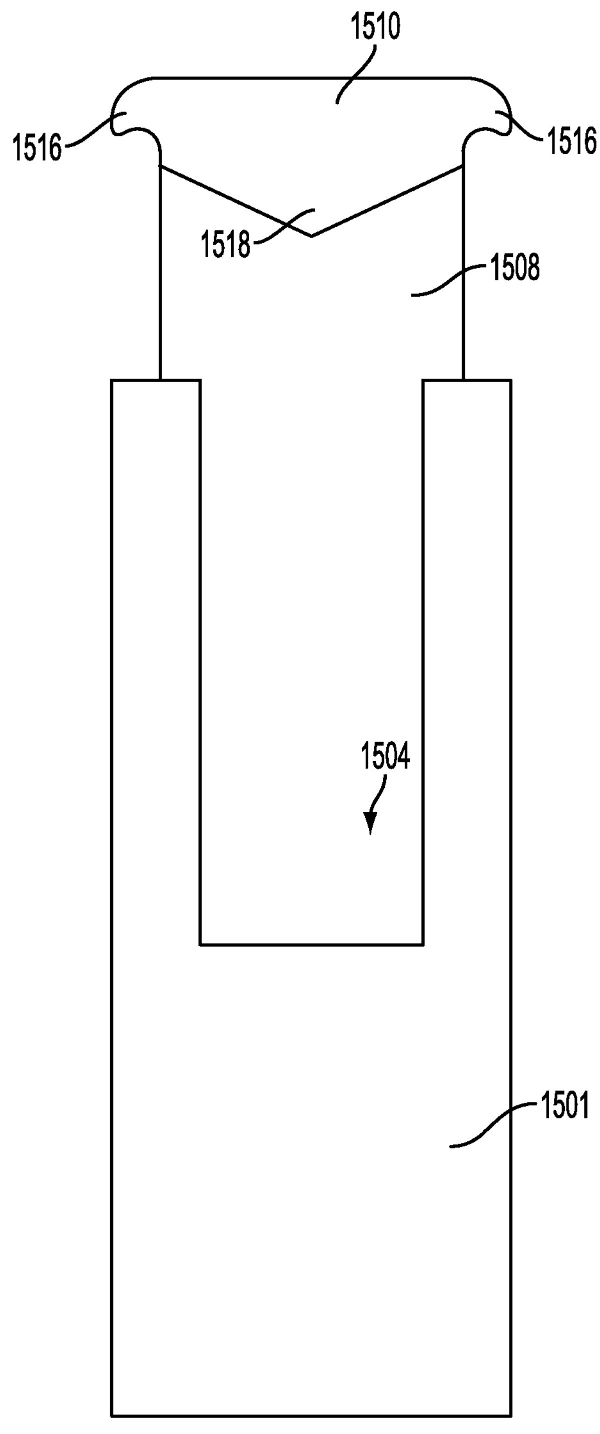


FIG. 43

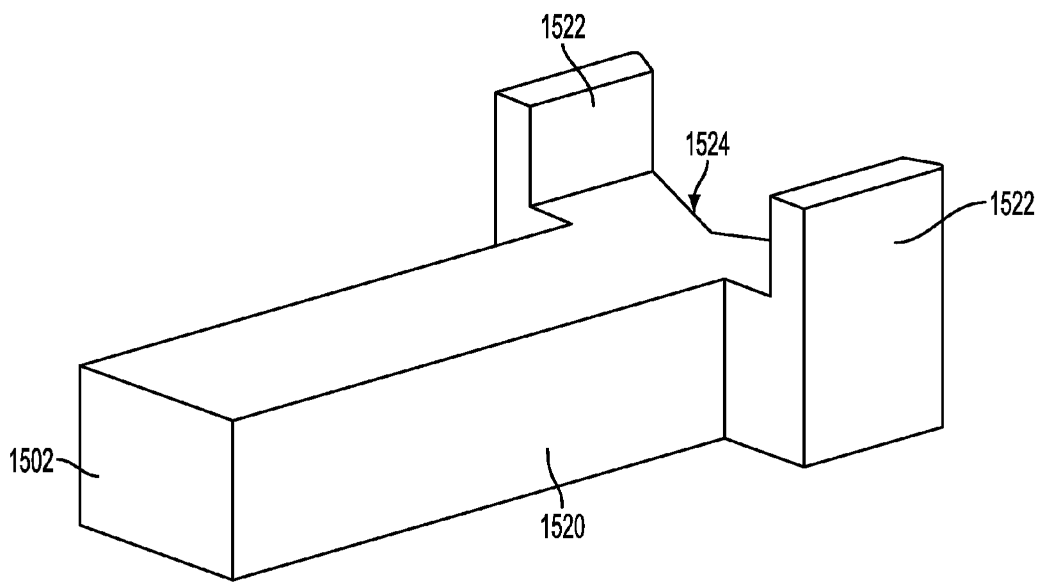


FIG. 44

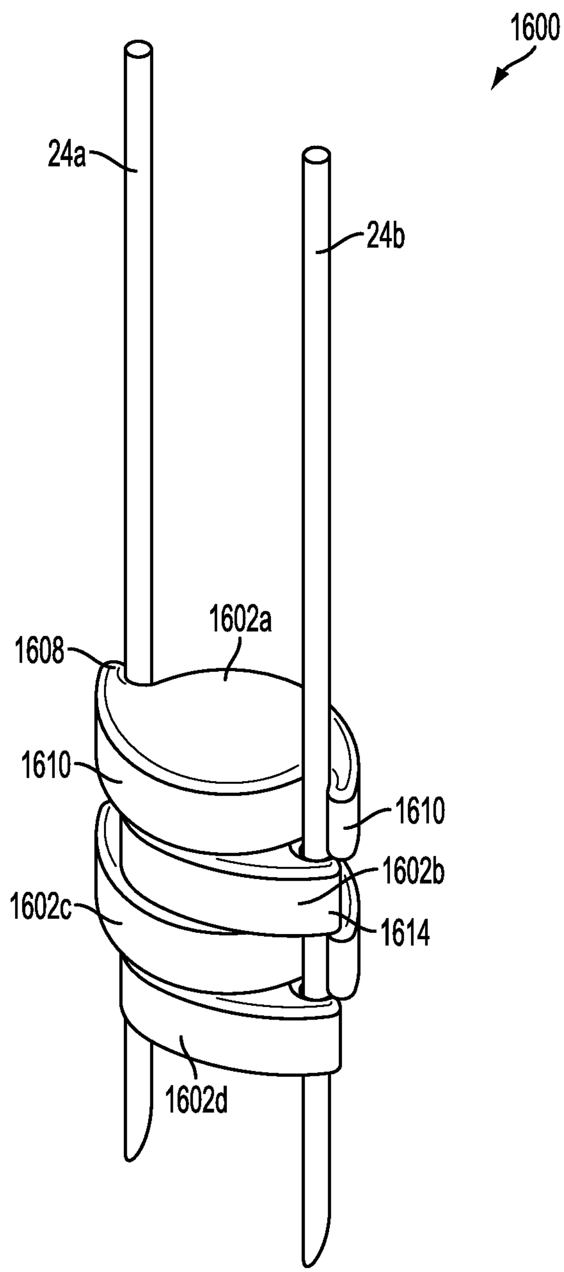


FIG. 45

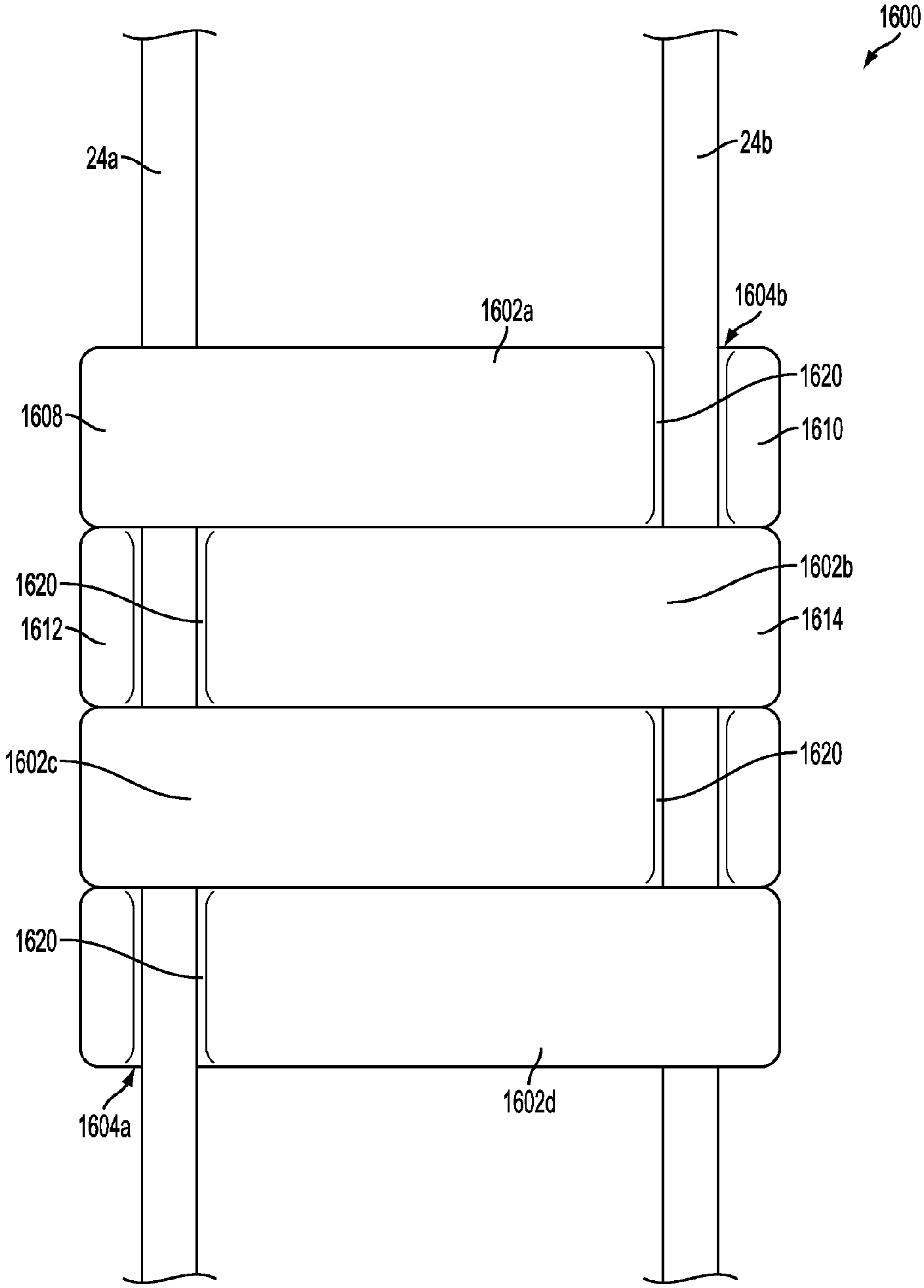

1600
24a
24b
1602a
1604b
1620
1608
1610
1620
1602b
1612
1614
1602c
1620
1620
1604a
1602d

FIG. 46

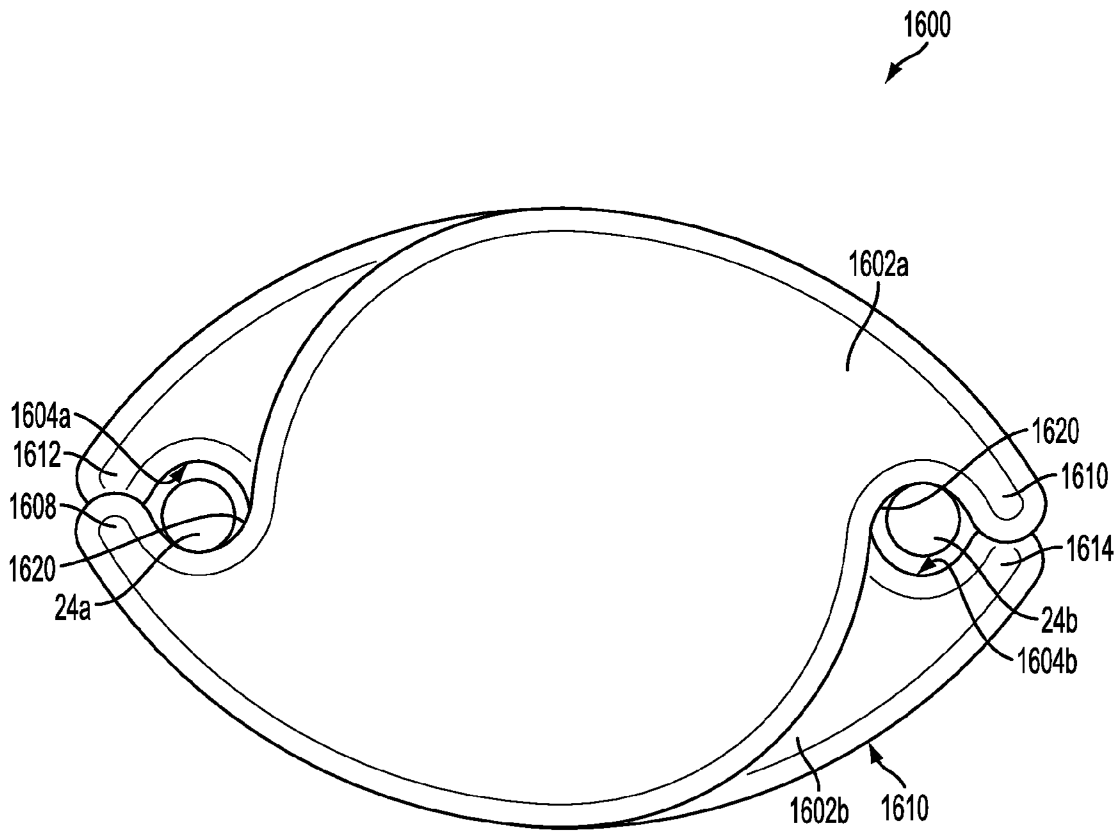

1600
1602a
1604a
1612
1608
1620
24a
1620
1610
1614
24b
1604b
1602b
1610

FIG. 47

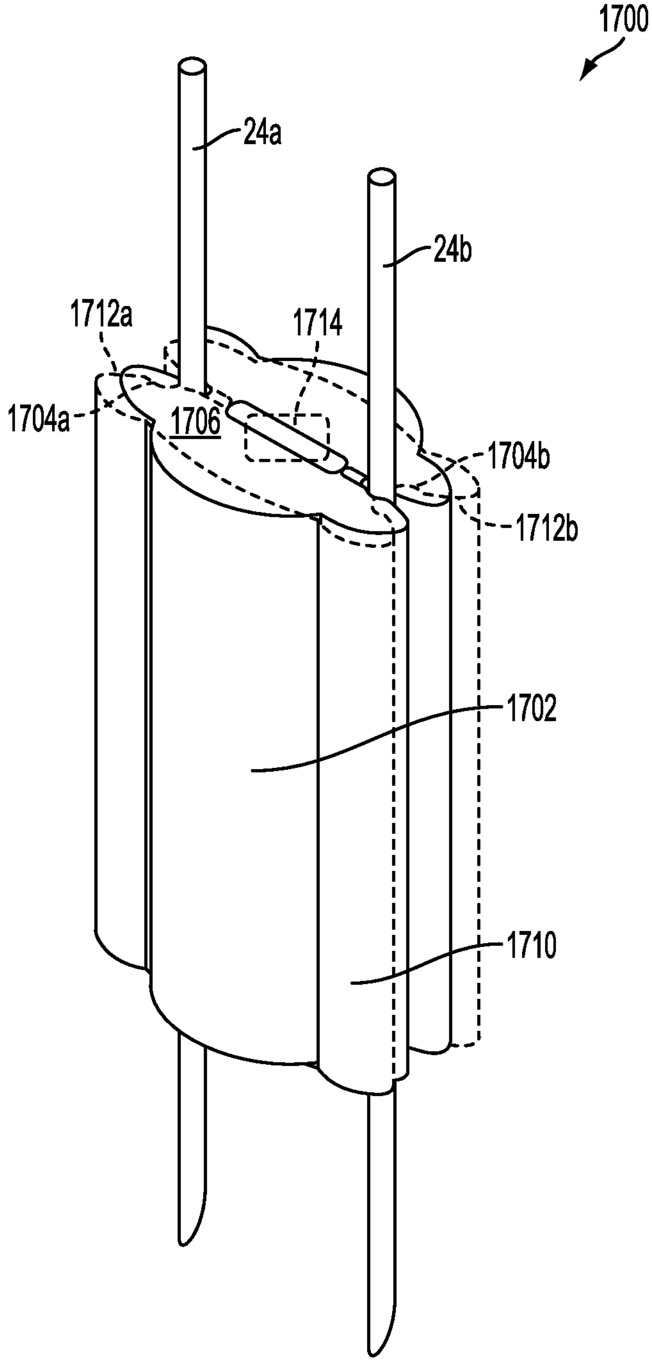


FIG. 48

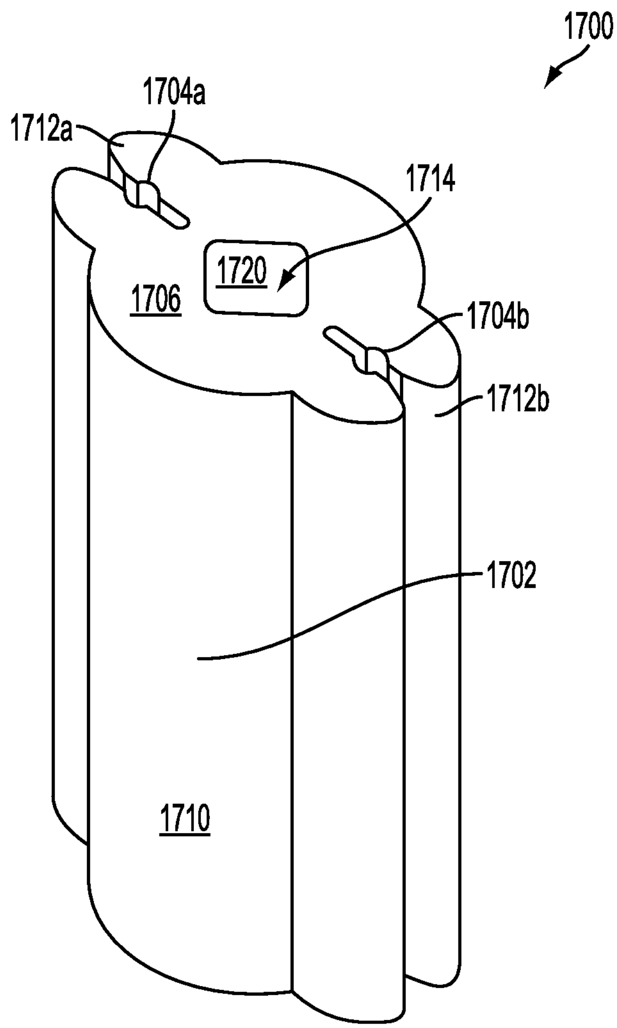


FIG. 49

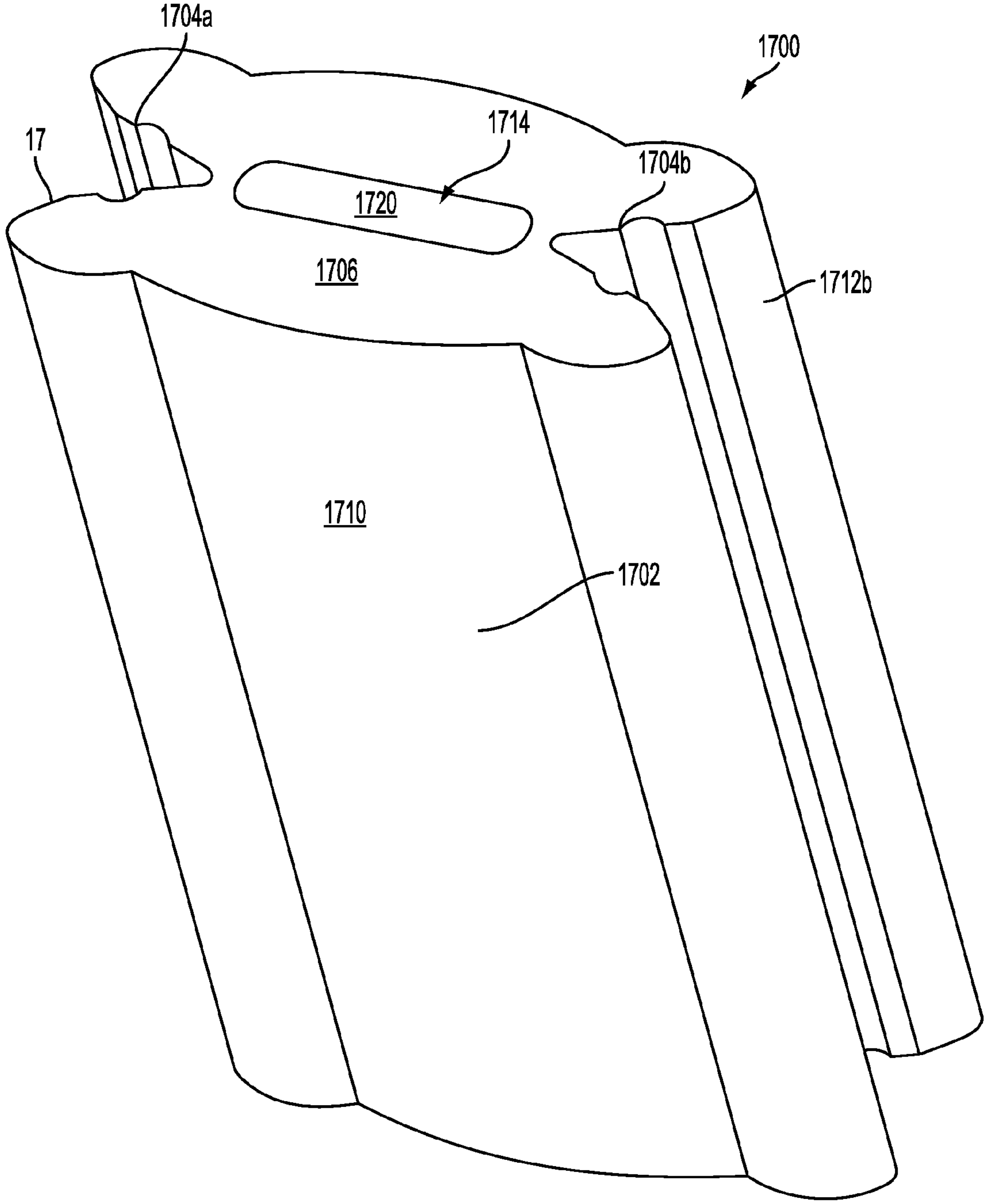


FIG. 50

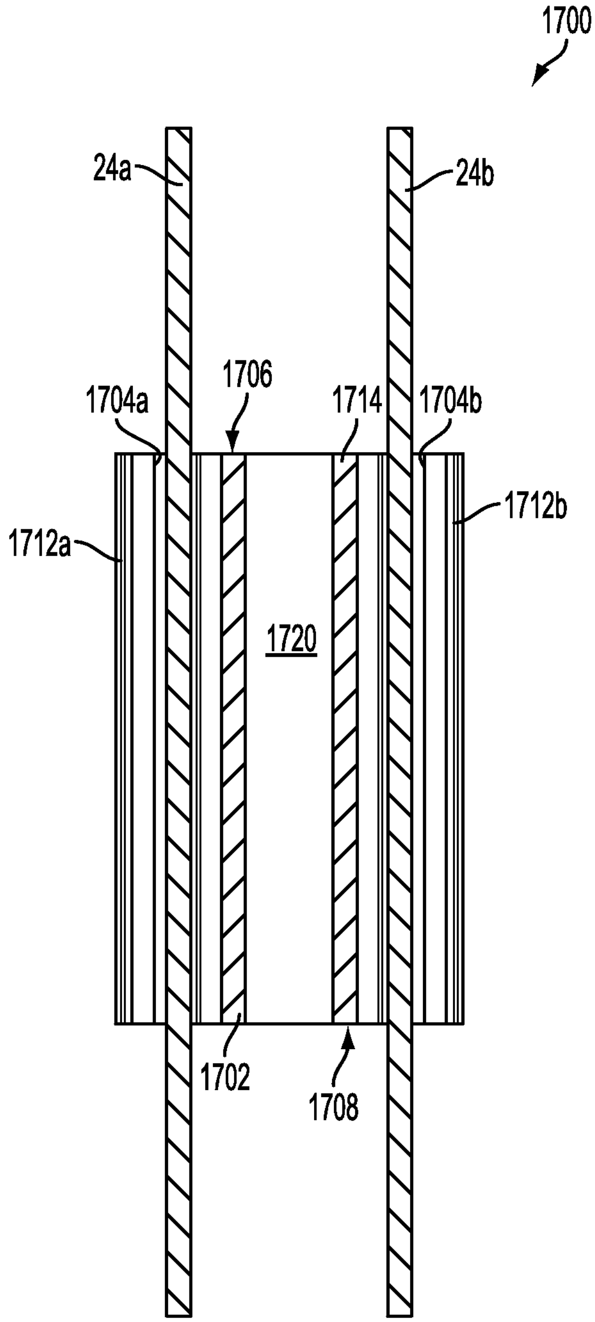

1700
24a
24b
1706
1704a
1714
1704b
1712b
1712a
1720
1702
1708

FIG. 51

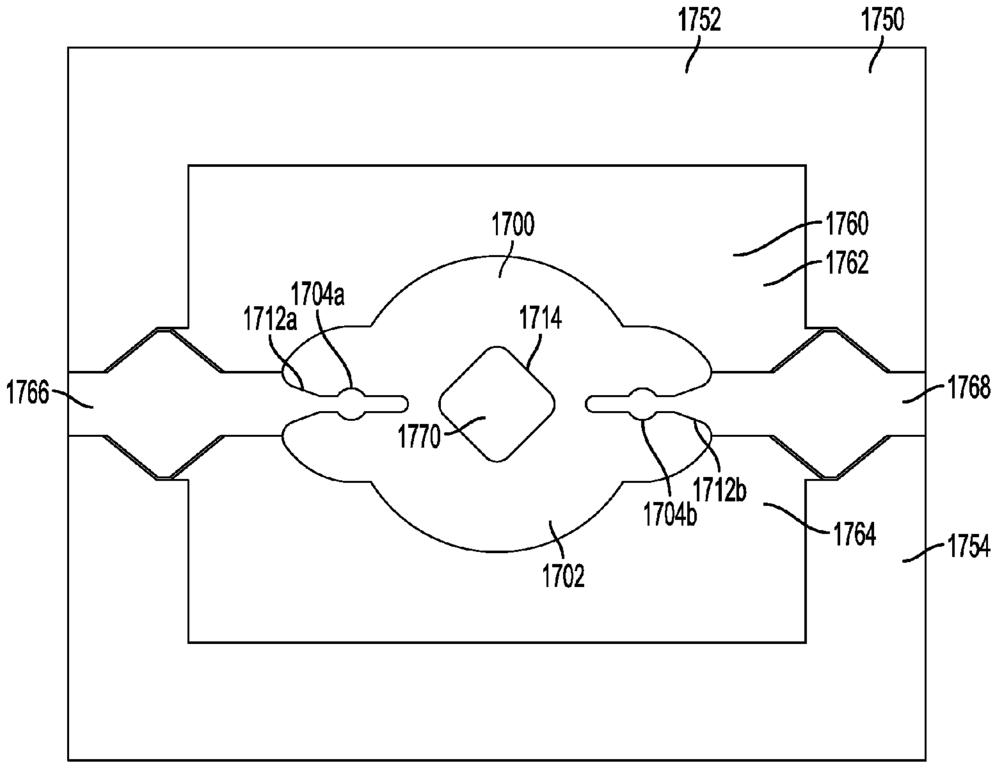

1752
1750
1760
1762
1700
1704a
1712a
1714
1766
1768
1770
1712b
1704b
1764
1754
1702

FIG. 52

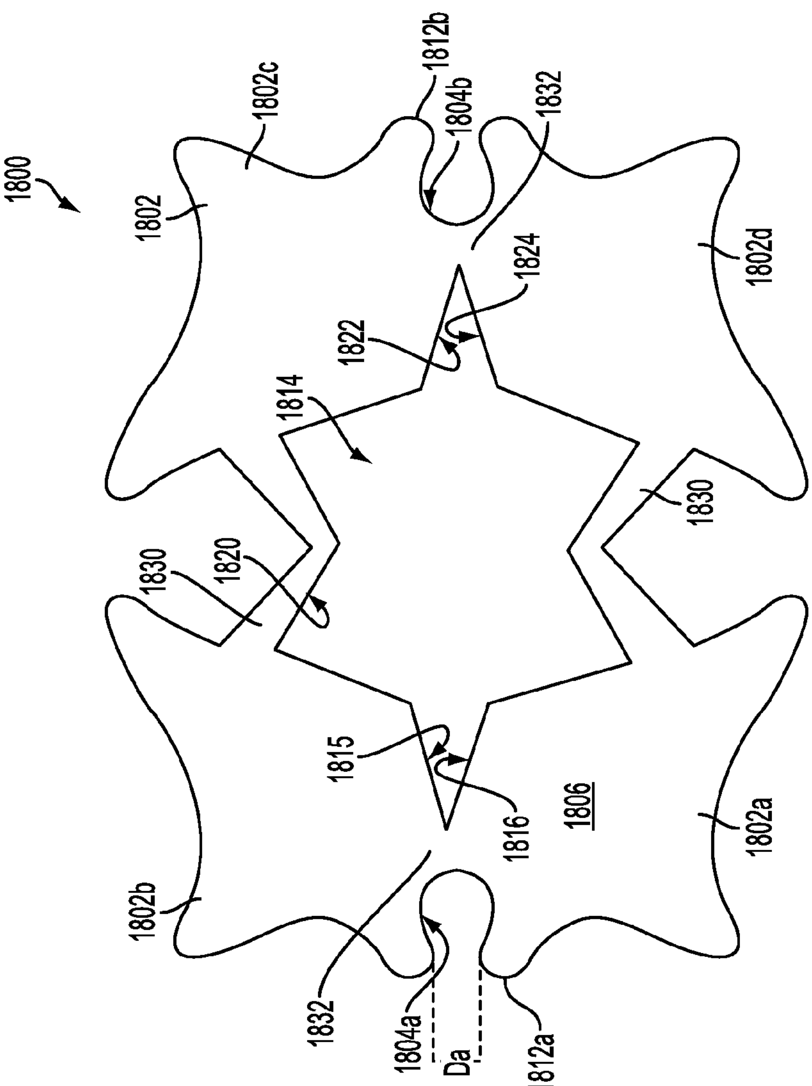

1800
1802
1802c
1812b
1804b
1832
1824
1802d
1822
1814
1830
1820
1830
1815
1816
1806
1802a
1802b
1832
1804a
Da
1812a

FIG. 53

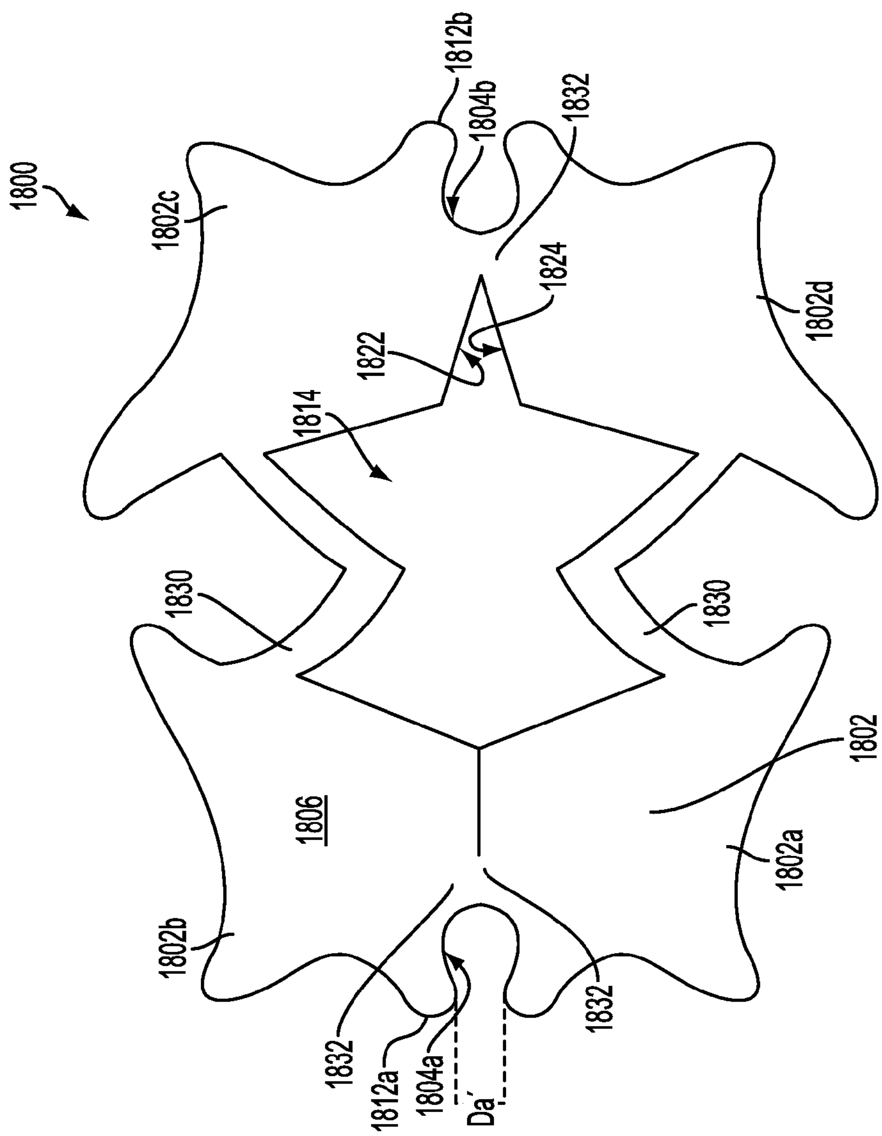

1800
1812b
1804b
1832
1802c
1824
1802d
1822
1814
1830
1830
1802
1806
1802a
1802b
1832
1832
1812a
1804a
Da'

FIG. 54

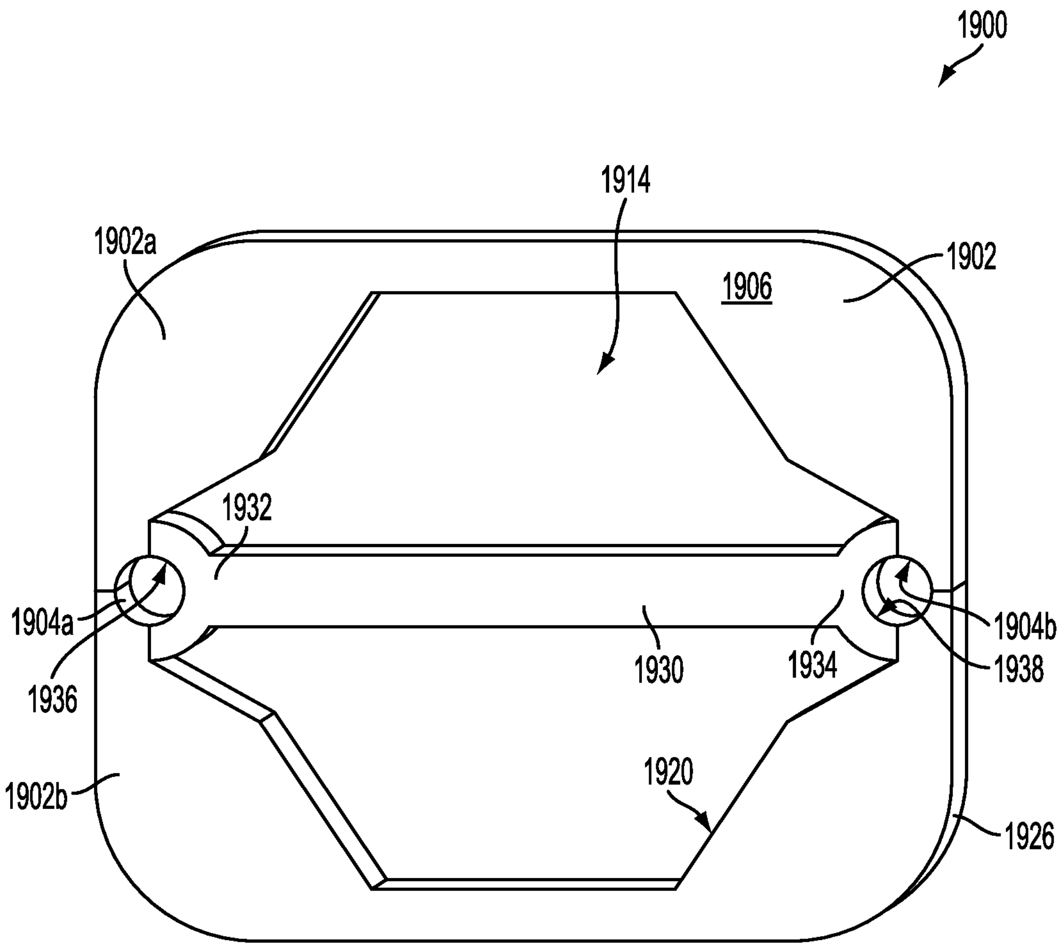

1900
1914
1902a
1906
1902
1932
1904a
1936
1930
1934
1904b
1938
1902b
1920
1926

FIG. 55

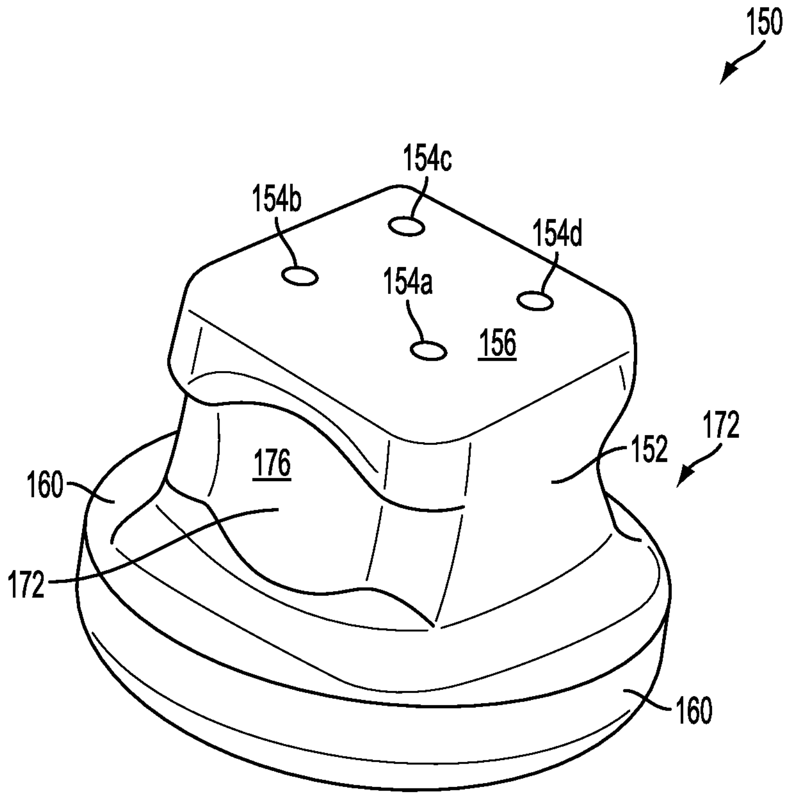


FIG. 56

NEEDLE PROBE GUIDE

FIELD OF TECHNOLOGY

The present invention generally relates to surgical devices and methods.

BACKGROUND

Electrical ablation therapy has been employed in medicine for the treatment of undesirable tissue such as diseased tissue, cancer, malignant and benign tumors, masses, lesions, and other abnormal tissue growths. While conventional apparatuses, systems, and methods for the electrical ablation of undesirable tissue are effective, one drawback with conventional electrical ablation treatment is the resulting permanent damage that may occur to the healthy tissue surrounding the abnormal tissue due primarily to the detrimental thermal effects resulting from exposing the tissue to thermal energy generated by the electrical ablation device. This may be particularly true when exposing the tissue to electric potentials sufficient to cause cell necrosis using high temperature thermal therapies including focused ultrasound ablation, radiofrequency (RF) ablation, or interstitial laser coagulation. Other techniques for tissue ablation include chemical ablation, in which chemical agents are injected into the undesirable tissue to cause ablation as well as surgical excision, cryotherapy, radiation, photodynamic therapy, Moh's micrographic surgery, topical treatments with 5-fluorouracil, laser ablation. Other drawbacks of conventional thermal, chemical, and other ablation therapy are cost, length of recovery, and the extraordinary pain inflicted on the patient.

Conventional thermal, chemical, and other ablation techniques have been employed for the treatment of a variety of undesirable tissue. Thermal and chemical ablation techniques have been used for the treatment of varicose veins resulting from reflux disease of the greater saphenous vein (GSV), in which the varicose vein is stripped and then is exposed to either chemical or thermal ablation. Other techniques for the treatment of undesirable tissue are more radical. Prostate cancer, for example, may be removed using a prostatectomy, in which the entire or part of prostate gland and surrounding lymph nodes are surgically removed. Like most other forms of cancer, radiation therapy may be used in conjunction with or as an alternate method for the treatment of prostate cancer. Another thermal ablation technique for the treatment of prostate cancer is RF interstitial tumor ablation (RITA) via trans-rectal ultrasound guidance. While these conventional methods for the treatment of prostate cancer are effective, they are not preferred by many surgeons and may result in detrimental thermal effects to healthy tissue surrounding the prostate. Similar thermal ablation techniques may be used for the treatment of basal cell carcinoma (BCC) tissue, a slowly growing cutaneous malignancy derived from the rapidly proliferating basal layer of the epidermis. BCC tissue in tumors ranging in size from about 5 mm to about 40 mm may be thermally ablated with a pulsed carbon dioxide laser. Nevertheless, carbon dioxide laser ablation is a thermal treatment method and may cause permanent damage to healthy tissue surrounding the BCC tissue. Furthermore, this technique requires costly capital investment in carbon dioxide laser equipment.

Undesirable tissue growing inside a body lumen such as the esophagus, large bowel, or in cavities formed in solid tissue such as the breast, for example, can be difficult to destroy using conventional ablation techniques. Surgical

removal of undesirable tissue, such as a malignant or benign tumor, from the breast is likely to leave a cavity. Surgical resection of residual intralumenal tissue may remove only a portion of the undesirable tissue cells within a certain margin of healthy tissue. Accordingly, some undesirable tissue is likely to remain within the wall of the cavity due to the limitation of conventional ablation instrument configurations, which may be effective for treating line-of-sight regions of tissue, but may be less effective for treating the residual undesirable tissue.

Accordingly, there remains a need for improved electrical ablation apparatuses, systems, and methods for the treatment of undesirable tissue found in diseased tissue, cancer, malignant and benign tumors, masses, lesions, and other abnormal tissue growths. There remains a need for minimally invasive treatment of undesirable tissue through the use of irreversible electroporation (IRE) ablation techniques without causing the detrimental thermal effects of conventional thermal ablation techniques.

SUMMARY

An aspect of the present disclosure is directed to a device for guiding electrodes relative to a tissue treatment region. The device comprises a body comprising a first passage through the body, wherein the first passage is structured to axially restrain a first electrode, and wherein the first electrode comprises a proximal end and a distal end. The body also comprises a second passage through the body, wherein the second passage is substantially parallel to the first passage, wherein the second passage is structured to axially restrain a second electrode, and wherein the second electrode comprises a proximal end and a distal end. Further, the distal end of the first electrode is spaced a predetermined distance from the distal end of the second electrode when the first electrode is restrained in the first passage and the second electrode is restrained in the second passage. The predetermined distance corresponds to a treatment distance in the tissue treatment region. Additionally, the distal ends of the first and second electrodes are operably structured to conduct current.

FIGURES

The novel features of the various described embodiments are set forth with particularity in the appended claims. The various embodiments, however, both as to organization and methods of operation, together with advantages thereof, may be understood in accordance with the following description taken in conjunction with the accompanying drawings as follows.

FIG. **1** is a schematic of an electrical ablation system and a flexible endoscope according to various embodiments of the present disclosure;

FIGS. **2**A-D depict one embodiment of the electrical ablation device of the electrical ablation system of FIG. **1** in various phases of deployment;

FIG. **3** is a perspective view of one embodiment of an electrical ablation device comprising multiple electrode probes according to various embodiments of the present disclosure;

FIG. **4** is a schematic illustrating the electrical ablation system shown in FIGS. **1** and **2**A-D in use to treat undesirable tissue located in the liver according to various embodiments of the present disclosure;

FIG. **5** is a detailed schematic illustrating the electrical ablation system shown in FIG. **4** in use to treat undesirable tissue located in the liver according to various embodiments of the present disclosure;

FIG. **6** is a perspective view of a probe guide according to various embodiments of the present disclosure;

FIG. **7** is an elevational view of one embodiment of the probe guide of FIG. **6**;

FIG. **8** is an elevational, cross-sectional view of one embodiment of the probe guide of FIG. **6**;

FIG. **9** is a perspective view of a probe guide having a handle according to various embodiments of the present disclosure;

FIG. **10** is an elevational view of one embodiment of the probe guide of FIG. **9**;

FIG. **11** is a perspective view of a probe guide according to various embodiments of the present disclosure;

FIG. **12** is a perspective view of a probe guide having a base according to various embodiments of the present disclosure;

FIG. **13** is an elevational view of one embodiment of the probe guide of FIG. **12**;

FIG. **14** is a plan view of one embodiment of the probe guide of FIG. **12**;

FIG. **15** is a perspective view of a probe guide according to various embodiments of the present disclosure;

FIG. **16** is a perspective view of a probe guide having a base according to various embodiments of the present disclosure;

FIG. **17** is a perspective view of a probe guide having orthogonal outlets according to various embodiments of the present disclosure;

FIG. **18** is a perspective view of a probe guide having an outlet according to various embodiments of the present disclosure;

FIG. **19** is a plan view of a probe guide having indicia of measurement according to various embodiments of the present disclosure;

FIG. **20** is a perspective view of a probe guide comprising a bore, and a plurality of ribs and vents according to various embodiments of the present disclosure;

FIG. **21** is a plan view of one embodiment of the probe guide of FIG. **20**;

FIG. **22** is a perspective, exploded view of a probe guide having a removable handle according to various embodiments of the present disclosure;

FIG. **23** is an elevational view of the removeable handle of one embodiment of the probe guide of FIG. **22**;

FIG. **24** is a perspective view of a locking element of one embodiment of the probe guide of FIG. **22**;

FIG. **25** is a perspective view of the body portion of one embodiment of the probe guide of FIG. **22**;

FIG. **26** is an elevational view of the body portion of one embodiment of the probe guide of FIG. **22**;

FIG. **27** is a plan view of the body portion of one embodiment of the probe guide of FIG. **22**;

FIG. **28** is a perspective view of a spring loaded probe guide according to various embodiments of the present disclosure;

FIG. **29** is an elevational view of one embodiment of the spring loaded probe guide of FIG. **28**;

FIG. **30** is a perspective view of the first body portion of one embodiment of the spring loaded probe guide of FIG. **28**;

FIG. **31** is a perspective view of the second body portion and the fasteners of one embodiment of the spring loaded probe guide of FIG. **28**;

FIG. **32** is a perspective view of a fastener of one embodiment of the spring loaded probe guide of FIG. **28**;

FIG. **33** is a perspective view of one embodiment of the spring loaded probe guide of FIG. **28** with the first body portion removed therefrom;

FIG. **34** is an elevational view of one embodiment of the spring loaded probe guide of FIG. **28** with the first body portion removed therefrom;

FIG. **35** is a perspective view of a spring loaded probe guide having a leaf spring and with the second body portion removed therefrom according to various embodiments of the present disclosure;

FIG. **36** is an elevational view of one embodiment of the spring loaded probe guide of FIG. **35** with the first body portion removed therefrom;

FIG. **37** is a perspective view of a spring loaded probe guide according to various embodiments of the present disclosure;

FIG. **38** is a perspective view of the second body portion of one embodiment of the spring loaded probe guide of FIG. **37**;

FIG. **39** is an elevational view of the second body portion of one embodiment of the spring loaded probe guide of FIG. **37**;

FIG. **40** is a perspective view of a spring loaded probe guide according to various embodiments of the present disclosure;

FIG. **41** is a perspective view of the first body portion of one embodiment of the spring loaded probe guide of FIG. **40**;

FIG. **42** is an elevational view of the first body portion of one embodiment of the spring loaded probe guide of FIG. **40**;

FIG. **43** is a plan view of the first body portion of one embodiment of the spring loaded probe guide of FIG. **40**;

FIG. **44** is a perspective view of the second body portion of one embodiment of the spring loaded probe guide of FIG. **40**;

FIG. **45** is an elevational view of a probe guide according to various embodiments of the present disclosure;

FIG. **46** is an elevational view of one embodiment of the probe guide of FIG. **45**;

FIG. **47** is a plan view of one embodiment of the probe guide of FIG. **45**;

FIG. **48** is a perspective view an elastomeric probe guide showing the outline of the elastomeric probe guide in an initial, undeformed configuration and in a second, deformed configuration according to various embodiments of the present disclosure;

FIG. **49** is a perspective view of one embodiment of the elastomeric probe guide of FIG. **48** depicting the body portion in the initial, undeformed configuration;

FIG. **50** is a perspective view of one embodiment of the elastomeric probe guide of FIG. **48** depicting the body portion in the second, deformed configuration;

FIG. **51** is an elevational, cross-sectional view of one embodiment of the elastomeric probe guide of FIG. **48** depicting the body portion in an initial, undeformed configuration;

FIG. **52** is a plan view of a frame for molding the elastomeric probe guide of FIG. **48** according to various embodiments of the present disclosure;

FIG. **53** is an elevational view of an elastomeric probe guide depicting the probe guide in an initial, undeformed configuration according to various embodiments of the present disclosure;

FIG. **54** is an elevational view of one embodiment of the elastomeric probe guide of FIG. **43** depicting the probe guide in a deformed configuration;

FIG. **55** is an elevational view of a probe guide having an elastomeric body and a substantially rigid beam according to various embodiments of the present disclosure; and

FIG. **56** is a perspective view of a probe guide according to various embodiments of the present disclosure.

DESCRIPTION

Various embodiments are directed to apparatuses, systems, and methods for the electrical ablation treatment of undesirable tissue such as diseased tissue, cancer, malignant and benign tumors, masses, lesions, and other abnormal tissue growths. Numerous specific details are set forth to provide a thorough understanding of the overall structure, function, manufacture, and use of the embodiments as described in the specification and illustrated in the accompanying drawings. It will be understood, however, that the embodiments may be practiced without such specific details. In other instances, well-known operations, components, and elements have not been described in detail so as not to obscure the embodiments described in the specification. Those of ordinary skill in the art will understand that the embodiments described and illustrated herein are non-limiting examples, and thus it can be appreciated that the specific structural and functional details disclosed herein may be representative and do not necessarily limit the scope of the embodiments, the scope of which is defined solely by the appended claims.

Reference throughout the specification to "various embodiments," "some embodiments," "one embodiment," or "an embodiment", or the like, means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. Thus, appearances of the phrases "in various embodiments," "in some embodiments," "in one embodiment," or "in an embodiment", or the like, in places throughout the specification are not necessarily all referring to the same embodiment. Furthermore, the particular features, structures, or characteristics may be combined in any suitable manner in one or more embodiments. Thus, the particular features, structures, or characteristics illustrated or described in connection with one embodiment may be combined, in whole or in part, with the features structures, or characteristics of one or more other embodiments without limitation.

It will be appreciated that the terms "operator", "surgeon" and "clinician" may be used interchangeably throughout the specification with reference to a person, multiple persons, a robotic device, multiple robotic devices, or a combination thereof that may use a surgical instrument described herein and/or perform a step of a method described herein. These terms are not intended to be limiting and absolute.

It will be appreciated that the terms "proximal" and "distal" may be used throughout the specification with reference to a clinician manipulating one end of an instrument used to treat a patient. The term "proximal" refers to the portion of the instrument closest to the clinician and the term "distal" refers to the portion located furthest from the clinician. It will be further appreciated that for conciseness and clarity, spatial terms such as "vertical," "horizontal," "up," and "down" may be used herein with respect to the illustrated embodiments. However, surgical instruments may be used in many orientations and positions, and these terms are not intended to be limiting and absolute.

Electrical ablation devices in accordance with the described embodiments may comprise one or more electrodes configured to be positioned into or proximal to undesirable tissue in a tissue treatment region (e.g., target site, worksite) where there is evidence of abnormal tissue growth, for example. In general, the electrodes comprise an electrically conductive portion (e.g., medical grade stainless steel) and are configured to electrically couple to an energy source. Once the electrodes are positioned into or proximal to the undesirable tissue, an energizing potential is applied to the electrodes to create an electric field to which the undesirable tissue is exposed. The energizing potential (and the resulting electric field) may be characterized by multiple parameters such as frequency, amplitude, pulse width (duration of a pulse or pulse length), and/or polarity. Depending on the diagnostic or therapeutic treatment to be rendered, a particular electrode may be configured either as an anode (+) or a cathode (−) or may comprise a plurality of electrodes with at least one configured as an anode and at least one other configured as a cathode. Regardless of the initial polar configuration, the polarity of the electrodes may be reversed by reversing the polarity of the output of the energy source.

In various embodiments, a suitable energy source may comprise an electrical waveform generator, which may be configured to create an electric field that is suitable to create irreversible electroporation in undesirable tissue at various electric field amplitudes and durations. The energy source may be configured to deliver irreversible electroporation pulses in the form of direct-current (DC) and/or alternating-current (AC) voltage potentials (e.g., time-varying voltage potentials) to the electrodes. The irreversible electroporation pulses may be characterized by various parameters such as frequency, amplitude, pulse length, and/or polarity. The undesirable tissue may be ablated by exposure to the electric potential difference across the electrodes.

In one embodiment, the energy source may comprise a wireless transmitter to deliver energy to the electrodes using wireless energy transfer techniques via one or more remotely positioned antennas. Wireless energy transfer or wireless power transmission is the process of transmitting electrical energy from an energy source to an electrical load without interconnecting wires. An electrical transformer is the simplest instance of wireless energy transfer. The primary and secondary circuits of a transformer are not directly connected and the transfer of energy takes place by electromagnetic coupling through a process known as mutual induction. Power also may be transferred wirelessly using RF energy. Wireless power transfer technology using RF energy is produced by Powercast, Inc. and can achieve an output of 6 volts for a little over one meter. Other low-power wireless power technology has been proposed such as described in U.S. Pat. No. 6,967,462, the entire disclosure of which is incorporated by reference herein.

The apparatuses, systems, and methods in accordance with certain described embodiments may be configured for minimally invasive ablation treatment of undesirable tissue through the use of irreversible electroporation to be able to ablate undesirable tissue in a controlled and focused manner without inducing thermally damaging effects to the surrounding healthy tissue. The apparatuses, systems, and methods in accordance with the described embodiments may be configured to ablate undesirable tissue through the use of electroporation or electropermeabilization. More specifically, in various embodiments, the apparatuses, systems, and methods in accordance with the described embodiments may be configured to ablate undesirable tissue through the use of irreversible electroporation. Electroporation increases the permeabilization of a cell membrane by exposing the cell to electric pulses. The external electric field (electric potential/ per unit length) to which the cell membrane is exposed to significantly increases the electrical conductivity and permeability of the plasma in the cell membrane. The primary parameter affecting the transmembrane potential is the potential difference across the cell membrane. Irreversible electroporation is the application of an electric field of a specific magnitude and duration to a cell membrane such that the permeabilization of the cell membrane cannot be reversed, leading to cell death without inducing a significant amount of heat in the cell membrane. The destabilizing potential forms pores in the cell membrane when the potential across the cell membrane exceeds its dielectric strength causing the cell to die under a process known as apoptosis and/or necrosis. The application of irreversible electroporation pulses to cells is an effective way to ablate large volumes of undesirable tissue without deleterious thermal effects to the surrounding healthy tissue associated with thermal-inducing ablation treatments. This is because irreversible electroporation destroys cells without heat and thus does not destroy the cellular support structure or regional vasculature. A destabilizing irreversible electroporation pulse, suitable to cause cell death without inducing a significant amount of thermal damage to the surrounding healthy tissue, may have amplitude in the range of about several hundred to about several thousand volts and is generally applied across biological membranes over a distance of about several millimeters, for example, for a relatively long duration. Thus, the undesirable tissue may be ablated in-vivo through the delivery of destabilizing electric fields by quickly creating cell necrosis.

The apparatuses, systems, and methods for electrical ablation therapy in accordance with the described embodiments may be adapted for use in minimally invasive surgical procedures to access the tissue treatment region in various anatomic locations such as the brain, lungs, breast, liver, gall bladder, pancreas, prostate gland, and various internal body lumen defined by the esophagus, stomach, intestine, colon, arteries, veins, anus, vagina, cervix, fallopian tubes, and the peritoneal cavity, for example, without limitation. Minimally invasive electrical ablation devices may be introduced to the tissue treatment region using a trocar inserted though a small opening formed in the patient's body or through a natural body orifice such as the mouth, anus, or vagina using translumenal access techniques known as Natural Orifice Translumenal Endoscopic Surgery (NOTES)™. Once the electrical ablation devices (e.g., electrodes) are located into or proximal to the undesirable tissue in the treatment region, electric field potentials can be applied to the undesirable tissue by the energy source. The electrical ablation devices can comprise portions that may be inserted into the tissue treatment region percutaneously (e.g., where access to inner organs or other tissue is done via needle-puncture of the skin). Other portions of the electrical ablation devices may be introduced into the tissue treatment region endoscopically (e.g., laparoscopically and/or thoracoscopically) through trocars or working channels of the endoscope, through small incisions, or transcutaneously (e.g., where electric pulses are delivered to the tissue treatment region through the skin).

FIG. **1** illustrates one embodiment of an electrical ablation system **10**. The electrical ablation system **10** may be employed to ablate undesirable tissue such as diseased tissues, cancers, tumors, masses, lesions, abnormal tissue growths inside a patient using electrical energy. The electrical ablation system **10** may be used in conjunction with endoscopic, laparoscopic, thoracoscopic, open surgical procedures via small incisions or keyholes, percutaneous techniques, transcutaneous techniques, and/or external non-invasive techniques, or any combinations thereof without limitation. The electrical ablation system **10** may be configured to be positioned within a natural body orifice of the patient such as the mouth, anus, or vagina and advanced through internal body lumen or cavities such as the esophagus, colon, cervix, urethra, for example, to reach the tissue treatment region. The electrical ablation system **10** also may be configured to be positioned and passed through a small incision or keyhole formed through the skin or abdominal wall of the patient to reach the tissue treatment region using a trocar. The tissue treatment region may be located in the brain, lungs, breast, liver, gall bladder, pancreas, prostate gland, various internal body lumen defined by the esophagus, stomach, intestine, colon, arteries, veins, anus, vagina, cervix, fallopian tubes, and the peritoneal cavity, for example, without limitation. The electrical ablation system **10** can be configured to treat a number of lesions and ostepathologies comprising metastatic lesions, tumors, fractures, infected sites, and/or inflamed sites. Once positioned into or proximate the tissue treatment region, the electrical ablation system **10** can be actuated (e.g., energized) to ablate the undesirable tissue. In one embodiment, the electrical ablation system **10** may be configured to treat diseased tissue in the gastrointestinal (GI) tract, esophagus, lung, or stomach that may be accessed orally. In another embodiment, the electrical ablation system **10** may be adapted to treat undesirable tissue in the liver or other organs that may be accessible using translumenal access techniques such as, without limitation, NOTES™ techniques, where the electrical ablation devices may be initially introduced through a natural orifice such as the mouth, anus, or vagina and then advanced to the tissue treatment site by puncturing the walls of internal body lumen such as the stomach, intestines, colon, cervix. In various embodiments, the electrical ablation system **10** may be adapted to treat undesirable tissue in the brain, liver, breast, gall bladder, pancreas, or prostate gland, using one or more electrodes positioned percutaneously, transcutaneously, translumenally, minimally invasively, and/or through open surgical techniques, or any combination thereof.

In one embodiment, the electrical ablation system **10** may be employed in conjunction with a flexible endoscope **12**, as well as a rigid endoscope, laparoscope, or thoracoscope, such as the GIF-H180 model available from Olympus Corporation. In one embodiment, the endoscope **12** may be introduced to the tissue treatment region trans-anally through the colon, trans-orally through the esophagus and stomach, trans-vaginally through the cervix, transcutaneously, or via an external incision or keyhole formed in the abdomen in conjunction with a trocar. The electrical ablation system **10** may be inserted and guided into or proximate the tissue treatment region using the endoscope **12**.

In the embodiment illustrated in FIG. **1**, the endoscope **12** comprises an endoscope handle **34** and an elongate relatively flexible shaft **32**. The distal end of the flexible shaft **32** may comprise a light source and a viewing port. Optionally, the flexible shaft **32** may define one or more working channels for receiving various instruments, such as electrical ablation devices, for example, therethrough. Images within the field of view of the viewing port are received by an optical device, such as a camera comprising a charge coupled device (CCD) usually located within the endoscope **12**, and are transmitted to a display monitor (not shown) outside the patient.

In one embodiment, the electrical ablation system **10** may comprise an electrical ablation device **20**, a plurality of electrical conductors **18**, a handpiece **16** comprising an activation switch **62**, and an energy source **14**, such as an electrical waveform generator, electrically coupled to the activation switch **62** and the electrical ablation device **20**. The electrical ablation device **20** comprises a relatively flexible member or shaft **22** that may be introduced to the tissue treatment region using a variety of known techniques such as an open incision and a trocar, through one of more of the working channels of the endoscope **12**, percutaneously, or transcutaneously, for example.

In one embodiment, one or more electrodes (e.g., needle electrodes, balloon electrodes), such as first and second electrodes **24***a*, **24***b*, extend out from the distal end of the electrical ablation device **20**. In one embodiment, the first electrode **24***a* may be configured as the positive electrode and the second electrode **24***b* may be configured as the negative electrode. The first electrode **24***a* is electrically connected to a first electrical conductor **18***a*, or similar electrically conductive lead or wire, which is coupled to the positive terminal of the energy source **14** through the activation switch **62**. The second electrode **24***b* is electrically connected to a second electrical conductor **18***b*, or similar electrically conductive lead or wire, which is coupled to the negative terminal of the energy source **14** through the activation switch **62**. The electrical conductors **18***a*, **18***b* are electrically insulated from each other and surrounding structures, except for the electrical connections to the respective electrodes **24***a*, **24***b*. In various embodiments, the electrical ablation device **20** may be configured to be introduced into or proximate the tissue treatment region using the endoscope **12** (laparoscope or thoracoscope), open surgical procedures, or external and non-invasive medical procedures. The electrodes **24***a*, **24***b* may be referred to herein as endoscopic or laparoscopic electrodes, although variations thereof may be inserted transcutaneously or percutaneously. As described herein, either one or both electrodes **24***a*, **24***b* may be adapted and configured to slideably move in and out of a cannula, lumen, or channel defined within the flexible shaft **22**.

Once the electrodes **24***a*, **24***b* are positioned at the desired location into or proximate the tissue treatment region, the electrodes **24***a*, **24***b* may be connected to or disconnected from the energy source **14** by actuating or de-actuating the switch **62** on the handpiece **16**. The switch **62** may be operated manually or may be mounted on a foot switch (not shown), for example. The electrodes **24***a*, **24***b* deliver electric field pulses to the undesirable tissue. The electric field pulses may be characterized based on various parameters such as pulse shape, amplitude, frequency, and duration. The electric field pulses may be sufficient to induce irreversible electroporation in the undesirable tissue. The induced potential depends on a variety of conditions such as tissue type, cell size, and electrical pulse parameters. The primary electrical pulse parameter affecting the transmembrane potential for a specific tissue type is the amplitude of the electric field and pulse length that the tissue is exposed to.

In one embodiment, a protective sleeve or sheath **26** may be slideably disposed over the flexible shaft **22** and within a handle **28**. In another embodiment, the sheath **26** may be slideably disposed within the flexible shaft **22** and the handle **28**, without limitation. The sheath **26** is slideable and may be located over the electrodes **24***a*, **24***b* to protect the trocar and prevent accidental piercing when the electrical ablation device **20** is advanced therethrough. Either one or both of the electrodes **24***a*, **24***b* of the electrical ablation device **20** may be adapted and configured to slideably move in and out of a cannula, lumen, or channel formed within the flexible shaft **22**. As described herein, the second electrode **24***b* may be fixed in place. The second electrode **24***b* may provide a pivot about which the first electrode **24***a* can be moved in an arc to other points in the tissue treatment region to treat larger portions of the diseased tissue that cannot be treated by fixing the electrodes **24***a*, **24***b* in one location. In one embodiment, either one or both of the electrodes **24***a*, **24***b* may be adapted and configured to slideably move in and out of a working channel formed within a flexible shaft **32** of the flexible endoscope **12** or may be located independently of the flexible endoscope **12**. Various features of the first and second electrodes **24***a*, **24***b* are described in more detail in FIGS. 2A-D.

In one embodiment, the first and second electrical conductors **18***a*, **18***b* may be provided through the handle **28**. In the illustrated embodiment, the first electrode **24***a* can be slideably moved in and out of the distal end of the flexible shaft **22** using a slide member **30** to retract and/or advance the first electrode **24***a*. In various embodiments either or both electrodes **24***a*, **24***b* may be coupled to the slide member **30**, or additional slide members, to advance and retract the electrodes **24***a*, **24***b*, e.g., position the electrodes **24***a*, **24***b*. In the illustrated embodiment, the first electrical conductor **18***a* coupled to the first electrode **24***a* is coupled to the slide member **30**. In this manner, the first electrode **24***a*, which is slideably movable within the cannula, lumen, or channel defined by the flexible shaft **22**, can advanced and retracted with the slide member **30**.

In various other embodiments, transducers or sensors **29** may be located in the handle **28** of the electrical ablation device **20** to sense the force with which the electrodes **24***a*, **24***b* penetrate the tissue in the tissue treatment zone. This feedback information may be useful to determine whether either one or both of the electrodes **24***a*, **24***b* have been properly inserted in the tissue treatment region. As is particularly well known, cancerous tumor tissue tends to be denser than healthy tissue and thus greater force is required to insert the electrodes **24***a*, **24***b* therein. The transducers or sensors **29** can provide feedback to the operator, surgeon, or clinician to physically sense when the electrodes **24***a*, **24***b* are placed within the cancerous tumor. The feedback information provided by the transducers or sensors **29** may be processed and displayed by circuits located either internally or externally to the energy source **14**. The sensor **29** readings may be employed to determine whether the electrodes **24***a*, **24***b* have been properly located within the cancerous tumor thereby assuring that a suitable margin of error has been achieved in locating the electrodes **24***a*, **24***b*.

In one embodiment, the input to the energy source **14** may be connected to a commercial power supply by way of a plug (not shown). The output of the energy source **14** is coupled to the electrodes **24***a*, **24***b*, which may be energized using the activation switch **62** on the handpiece **16**, or in one embodiment, an activation switch mounted on a foot activated pedal (not shown). The energy source **14** may be configured to produce electrical energy suitable for electrical ablation, as described in more detail herein.

In one embodiment, the electrodes **24***a*, **24***b* are adapted and configured to electrically couple to the energy source **14** (e.g., generator, waveform generator). Once electrical energy is coupled to the electrodes **24***a*, **24***b*, an electric field is formed at a distal end of the electrodes **24***a*, **24***b*. The energy source **14** may be configured to generate electric pulses at a predetermined frequency, amplitude, pulse length, and/or polarity that are suitable to induce irreversible electroporation to ablate substantial volumes of undesirable tissue in the treatment region. For example, the energy source **14** may be configured to deliver DC electric pulses having a predetermined frequency, amplitude, pulse length, and/or polarity suitable to induce irreversible electroporation to ablate substantial volumes of undesirable tissue in the treatment region. The DC pulses may be positive or negative relative to a particular reference polarity. The polarity of the DC pulses may be reversed or inverted from positive-to-negative or negative-to-positive a predetermined number of times to induce irreversible electroporation to ablate substantial volumes of undesirable tissue in the treatment region.

In one embodiment, a timing circuit may be coupled to the output of the energy source **14** to generate electric pulses. The timing circuit may comprise one or more suitable switching elements to produce the electric pulses. For example, the energy source **14** may produce a series of n electric pulses (where n is any positive integer) of sufficient amplitude and duration to induce irreversible electroporation suitable for tissue ablation when the n electric pulses are applied to the electrodes **24***a*, **24***b*. In one embodiment, the electric pulses may have a fixed or variable pulse length, amplitude, and/or frequency.

The electrical ablation device **20** may be operated either in bipolar or monopolar mode. In bipolar mode, the first electrode **24***a* is electrically connected to a first polarity and the second electrode **24***b* is electrically connected to the opposite polarity. For example, in monopolar mode, the first electrode **24***a* is coupled to a prescribed voltage and the second electrode **24***b* is set to ground. In the illustrated embodiment, the energy source **14** may be configured to operate in either the bipolar or monopolar modes with the electrical ablation system **10**. In bipolar mode, the first electrode **24***a* is electrically connected to a prescribed voltage of one polarity and the second electrode **24***b* is electrically connected to a prescribed voltage of the opposite polarity. When more than two electrodes are used, the polarity of the electrodes may be alternated so that any two adjacent electrodes may have either the same or opposite polarities, for example.

In one embodiment, the energy source **14** may be configured to produce RF waveforms at predetermined frequencies, amplitudes, pulse widths or durations, and/or polarities suitable for electrical ablation of cells in the tissue treatment region. One example of a suitable RF energy source is a commercially available conventional, bipolar/monopolar electrosurgical RF generator such as Model Number ICC 350, available from Erbe, GmbH.

In one embodiment, the energy source **14** may be configured to produce destabilizing electrical potentials (e.g., fields) suitable to induce irreversible electroporation. The destabilizing electrical potentials may be in the form of bipolar/monopolar DC electric pulses suitable for inducing irreversible electroporation to ablate tissue undesirable tissue with the electrical ablation device **20**. A commercially available energy source suitable for generating irreversible electroporation electric field pulses in bipolar or monopolar mode is a pulsed DC generator such as Model Number ECM 830, available from BTX Molecular Delivery Systems. In bipolar mode, the first electrode **24***a* may be electrically coupled to a first polarity and the second electrode **24***b* may be electrically coupled to a second (e.g., opposite) polarity of the energy source **14**. Bipolar/monopolar DC electric pulses may be produced at a variety of frequencies, amplitudes, pulse lengths, and/or polarities. Unlike RF ablation systems, however, which require high power and energy levels delivered into the tissue to heat and thermally destroy the tissue, irreversible electroporation requires very little energy input into the tissue to kill the undesirable tissue without the detrimental thermal effects because with irreversible electroporation the cells are destroyed by electric field potentials rather than heat.

In one embodiment, the energy source **14** may be coupled to the first and second electrodes **24***a*, **24***b* by either a wired or a wireless connection. In a wired connection, the energy source **14** is coupled to the electrodes **24***a*, **24***b* by way of the electrical conductors **18***a*, **18***b*, as shown. In a wireless connection, the electrical conductors **18***a*, **18***b* may be replaced with a first antenna (not shown) coupled the energy source **14** and a second antenna (not shown) coupled to the electrodes **24***a*, **24***b*, wherein the second antenna is remotely located from the first antenna. In one embodiment, the energy source may comprise a wireless transmitter to deliver energy to the electrodes using wireless energy transfer techniques via one or more remotely positioned antennas.

In at least one embodiment, the energy source **14** can be configured to produce DC electric pulses at frequencies in the range of approximately 1 Hz to approximately 10000 Hz, amplitudes in the range of approximately ±100 to approximately ±8000 VDC, and pulse lengths (e.g., pulse width, pulse duration) in the range of approximately 1 μs to approximately 100 ms. In at least one embodiment, the energy source can be configured to produce biphasic waveforms and/or monophasic waveforms that alternate around approximately 0V. In various embodiments, for example, the polarity of the electric potentials coupled to the electrodes **24***a*, **24***b* can be reversed during the electrical ablation therapy. For example, initially, the DC electric pulses can have a positive polarity and an amplitude in the range of approximately +100 to approximately +3000 VDC. Subsequently, the polarity of the DC electric pulses can be reversed such that the amplitude is in the range of approximately −100 to approximately −3000 VDC. In another embodiment, the DC electric pulses can have an initial positive polarity and amplitude in the range of approximately +100 to +6000 VDC and a subsequently reversed polarity and amplitude in the range of approximately −100 to approximately −6000 VDC.

In at least one embodiment, the undesirable cells in the tissue treatment region can be electrically ablated with DC pulses suitable to induce irreversible electroporation at frequencies of approximately 10 Hz to approximately 100 Hz, amplitudes in the range of approximately +700 to approximately +1500 VDC, and pulse lengths of approximately 10 μs to approximately 50 μs. In another embodiment, the abnormal cells in the tissue treatment region can be electrically ablated with an electrical waveform having an amplitude of approximately +500 VDC and pulse duration of approximately 20 ms delivered at a pulse period T or repetition rate, frequency f=1/T, of approximately 10 Hz. In another embodiment, the undesirable cells in the tissue treatment region can be electrically ablated with DC pulses suitable to induce irreversible electroporation at frequencies of approximately 200 Hz, amplitudes in the range of approximately +3000 VDC, and pulse lengths of approximately 10 ms. It has been determined that an electric field strength of 1,000V/cm can be suitable for destroying living tissue by inducing irreversible electroporation by DC electric pulses.

In various embodiments, the energy source **14** can be configured to produce AC electric pulses at frequencies in the range of approximately 1 Hz to approximately 10000 Hz, amplitudes in the range of approximately ±8000 to approximately ±8000 VAC, and pulse lengths (e.g., pulse width, pulse duration) in the range of approximately 1 μs to approximately 100 ms. In one embodiment, the undesirable cells in the tissue treatment region can be electrically ablated with AC pulses suitable to induce irreversible electroporation at pulse frequencies of approximately 4 Hz, amplitudes of approximately ±6000 VAC, and pulse lengths of approximately 20 ms. It has been determined that an electric field strength of 1,500V/cm can be suitable for destroying living tissue by inducing irreversible electroporation by AC electric pulses.

FIGS. **2**A-D illustrate one embodiment of the electrical ablation device **20** in various phases of deployment. In the embodiment illustrated in FIGS. **2**A-D, the sheath **26** is disposed over the flexible shaft **22**, however, the sheath **26** may be disposed within the flexible shaft **22**. The electrical ablation device **20** may be used in conjunction with the electrical ablation system **10** shown in FIG. **1**. It will be appreciated that other devices and electrode configurations may be employed without limitation, such as, for example, the electrical ablation device **800** having electrodes **824***a*, **824***b*, **824***c*, **824***d*, as described herein. FIG. **2**A illustrates an initial phase of deployment wherein the sheath **26** is extended in the direction indicated by arrow **40** to cover the electrodes **24***a*, **24***b*. The electrodes **24***a*, **24***b* may have dimensions of about 0.5 mm, about 1 mm, or about 1.5 mm in diameter. It will be appreciated that the dimensions of the electrodes **24***a*, **24***b* may be anywhere from about 0.5 mm to about 1.5 mm in diameter. The electrical ablation device **20** may be introduced into the tissue treatment region through a trocar, as illustrated in FIG. **4**, for example. FIG. **2**B illustrates another phase of deployment wherein the sheath **26** is retracted within the handle **28** in the direction indicated by arrow **42**. In this phase of deployment, the first and second electrodes **24***a*, **24***b* extend through the distal end of the flexible shaft **22** and are ready to be inserted into or proximate the tissue treatment region. The first electrode **24***a* may be retracted in direction **42** through a lumen **44** formed in the flexible shaft **22** by holding the handle **28** and pulling on the slide member **30**. FIG. **2**C illustrates a transition phase wherein the first electrode **24***a* is the process of being retracted in direction **42** by pulling on the slide member **30** handle, for example, in the same direction. FIG. **2**D illustrates another phase of deployment wherein the first electrode **24***a* is in a fully retracted position. In this phase of deployment the electrical ablation device **20** can be pivotally rotated about an axis **46** defined by the second electrode **24***b*. The electrodes **24***a*, **24***b* are spaced apart by a treatment distance "r." The treatment distance "r" between the electrodes **24***a*, **24***b* may be 5.0 mm, about 7.5 mm, or about 10 mm. The treatment distance "r" between the electrodes **24***a*, **24***b* may be 1.0 cm, about 1.5 cm, or about 2 cm. Thus, the electrical ablation device **20** may be rotated in an arc about the pivot formed by the second electrode **24***b*, the first electrode **24***a* may be placed in a new location in the tissue treatment region within the treatment radius "r." Retracting the first electrode **24***a* and pivoting about the second electrode **24***b* enables the surgeon or clinician to target and treat a larger tissue treatment region essentially comprising a circular region having a treatment radius "r," which is the distance between the electrodes **24***a*, **24***b*. Thus, the electrodes **24***a*, **24***b* may be located in a plurality of positions in and around the tissue treatment region in order to treat much larger regions of tissue. Increasing the electrode **24***a*, **24***b* diameter and spacing the electrodes **24***a*, **24***b* further apart enables the generation of an electric field over a much larger tissue regions and thus the ablation of larger volumes of undesirable tissue. In this manner, the operator can treat a larger tissue treatment region comprising cancerous lesions, polyps, or tumors, for example.

Although the electrical ablation electrodes according to the described embodiments have been described in terms of the particular needle type electrodes **24***a*, **24***b* as shown in the embodiments illustrated in FIGS. **1** and **2**A-D, other configurations of electrical ablation electrodes may be employed for the ablation of undesirable tissue, without limitation. In one embodiment, the electrical ablation device **20** may comprise two or more fixed electrodes that are non-retractable. In another embodiment, the electrical ablation device **20** may comprise two or more retractable electrodes, one embodiment of which is described below with reference to FIG. **3**. In another embodiment, the electrical ablation device **20** may comprise at least one slidable electrode disposed within at least one working channel of the flexible shaft **32** of the endoscope **12**. In another embodiment, the electrical ablation device **20** may comprise at least one electrode may be configured to be inserted into the tissue treatment region transcutaneously or percutaneously. Still in various other embodiments, the electrical ablation device **20** may comprise at least one electrode configured to be introduced to the tissue treatment region transcutaneously or percutaneously and at least one other electrode may be configured to be introduced to the tissue treatment region through at least one working channel of the flexible shaft **32** of the endoscope **12**. The embodiments, however, are not limited in this context.

Various electrical ablation devices are disclosed in commonly-owned U.S. patent application Ser. No. 11/897,676 titled "ELECTRICAL ABLATION SURGICAL INSTRUMENTS," filed Aug. 31, 2007, now U.S. Patent Application Publication No. 2009/0062788, the entire disclosure of which is incorporated herein by reference in its entirety. Various other devices are disclosed in commonly-owned U.S. patent application Ser. No. 12/352,375, titled "ELECTRICAL ABLATION DEVICES", filed on Jan. 12, 2009, now U.S. Patent Application Publication No. 2010/0179530, the entire disclosure of which is incorporated herein by reference in its entirety.

As previously described with reference to the embodiments illustrated in FIGS. **2**A-D, as shown in FIG. **3**, in one embodiment, the protective sleeve or sheath **26** may be slidably disposed over the flexible shaft **22** and within the handle **28**. In an initial phase of deployment, the sheath **26** is extended in direction **40** to cover the electrodes **824***a*, **824***b*, **824***c*, **824***d* to protect the trocar and prevent accidental piercing when the electrical ablation device **800** is advanced therethrough. Once the electrodes **824***a*, **824***b*, **824***c*, **824***d* are located into or proximate the tissue treatment region, the sheath **26** is retracted in direction **42** to expose the electrodes **824***a*, **824***b*, **824***c*, **824***d*. One or more of the electrodes **824***a*, **824***b*, **824***c*, **824***d* of the electrical ablation device **800** may be adapted and configured to slideably move in and out of a cannula, lumen, or channel formed within the flexible shaft **22**. In one embodiment all of the electrodes **824***a*, **824***b*, **824***c*, **824***d* are configured to slideably move in and out channels formed within lumens formed within the flexible shaft **22**, referred to for example as the lumen **44** in the embodiments illustrated in FIGS. **2**A-D, to advance and retract the electrodes **824***a*, **824***b*, **824***c*, **824***d* as may be desired by the operator. Nevertheless, in other embodiments, it may be desired to fix all or certain ones of the one or more electrodes **824***a*, **824***b*, **824***c*, **824***d* in place.

The various embodiments of electrodes described in the present specification, e.g., the electrodes **24***a*, **24***b*, or **824***a*-

m, may be configured for use with an electrical ablation device (not shown) comprising an elongated flexible shaft to house the needle electrodes **24***a*, **24***b*, or **824***a-m*, for example. The needle electrodes **24***a*, **24***b*, or **824***a-m*, are free to extend past a distal end of the electrical ablation device. The flexible shaft comprises multiple lumen formed therein to slidably receive the needle electrodes **24***a*, **24***b*, or **824***a-m*. A flexible sheath extends longitudinally from a handle portion to the distal end. The handle portion comprises multiple slide members received in respective slots defining respective walls. The slide members are coupled to the respective needle electrodes **24***a*, **24***b*, or **824***a-m*. The slide members are movable to advance and retract the electrode **24***a*, **24***b*, or **824***a-m*. The needle electrodes **24***a*, **24***b*, or **824***a-m*, may be independently movable by way of the respective slide members. The needle electrodes **24***a*, **24***b*, or **824***a-m*, may be deployed independently or simultaneously. An electrical ablation device (not shown) comprising an elongated flexible shaft to house multiple needle electrodes and a suitable handle is described in commonly owned U.S. patent application Ser. No. 11/897,676 titled "ELECTRICAL ABLATION SURGICAL INSTRUMENTS," filed Aug. 31, 2007, now U.S. Patent Application Publication No. 2009/0062788, the entire disclosure of which is incorporated herein by reference in its entirety.

It will be appreciated that the embodiments of the electrical ablation devices **20**, **800** described with referenced to FIGS. **2**A-D and **3**, may be introduced inside a patient endoscopically, transcutaneously, percutaneously, through an open incision, through a trocar (as shown in FIG. **4**), through a natural orifice, or any combination thereof. In one embodiment, the outside diameter of the electrical ablation devices **20**, **800** may be sized to fit within a working channel of an endoscope and in other embodiments the outside diameter of the electrical ablation devices **20**, **800** may be sized to fit within a hollow outer sleeve **620**, or trocar, as shown in FIG. **4**, for example. The hollow outer sleeve **620** or trocar is inserted into the upper gastrointestinal tract of a patient and may be sized to also receive a flexible endoscopic portion of an endoscope **622** (e.g., gastroscope), similar to the endoscope **12** described in FIG. **1**.

FIG. **4** illustrates one embodiment of the electrical ablation system **10** shown in FIG. **1** in use to treat undesirable tissue **48** located in the liver **50**. The undesirable tissue **48** may be representative of a variety of diseased tissues, cancers, tumors, masses, lesions, abnormal tissue growths, for example. In use, the electrical ablation device **20** may be introduced into or proximate the tissue treatment region through a port **52** of a trocar **54**. The trocar **54** is introduced into the patient via a small incision **59** formed in the skin **56**. The endoscope **12** may be introduced into the patient trans-anally through the colon, trans-vaginally, trans-orally down the esophagus and through the stomach using translumenal techniques, or through a small incision or keyhole formed through the patient's abdominal wall (e.g., the peritoneal wall). The endoscope **12** may be employed to guide and locate the distal end of the electrical ablation device **20** into or proximate the undesirable tissue **48**. Prior to introducing the flexible shaft **22** through the trocar **54**, the sheath **26** is slid over the flexible shaft **22** in a direction towards the distal end thereof to cover the electrodes **24***a*, **24***b* (as shown in FIG. **2**A) until the distal end of the electrical ablation device **20** reaches the undesirable tissue **48**.

Once the electrical ablation device **20** has been suitably introduced into or proximate the undesirable tissue **48**, the sheath **26** is retracted to expose the electrodes **24***a*, **24***b* (as shown in FIG. **2**B) to treat the undesirable tissue **48**. To ablate the undesirable tissue **48**, the operator initially may locate the first electrode **24***a* at a first position **58***a* and the second electrode **24***b* at a second position **60** using endoscopic visualization and maintaining the undesirable tissue **48** within the field of view of the flexible endoscope **12**. In various embodiments, the operator may place the first and/or second electrodes **24***a*, **24***b* with the aid of pre-operative and/or intra-operative images such as, for example, images acquired by magnetic resonance imaging (MRI), X-ray fluorescence (XRF) imaging, ultrasound imaging and/or computed tomography (CT) imaging, for example. The pre-operative and intra-operative images can comprise a three-dimensional image of the patient's body, for example, and can aid the operator in placing the electrodes **24***a*, **24***b* in or proximal to the undesired tissue **48** in the tissue treatment region while maintaining a safe distance from critical structures within the body, for example. In various embodiments, the pre-operative and intra-operative images can be recorded and registered into a common coordinate system mapped to the patient's body, for example. In some embodiments, registration points can be attached to the patient's body during a pre-operative scan, for example, and can be left in place during the surgical procedure, for example. Further, in such embodiments, the electrical ablation device **20** can comprise registration points, such as registration points on the handpiece **16** (FIG. **1**) and/or on the electrodes **24***a*, **24***b*, for example, such that the position of the electrodes **24***a*, **24***b* relative to registration points within the patient's body can be determined.

The first position **58***a* may be near a perimeter edge of the undesirable tissue **48**. Once the electrodes **24***a*, **24***b* are located into or proximate the undesirable tissue **48**, the electrodes **24***a*, **24***b* are energized with irreversible electroporation pulses to create a first necrotic zone **65***a*. For example, once the first and second electrodes **24***a*, **24***b* are located in the desired positions **60** and **58***a*, the undesirable tissue **48** may be exposed to an electric field generated by energizing the first and second electrodes **24***a*, **24***b* with the energy source **14**. The electric field may have a magnitude, frequency, and pulse length suitable to induce irreversible electroporation in the undesirable tissue **48** within the first necrotic zone **65***a*. The size of the necrotic zone is substantially dependent on the size and separation of the electrodes **24***a*, **24***b*, as previously described. The treatment time is defined as the time that the electrodes **24***a*, **24***b* are activated or energized to generate the electric pulses suitable for inducing irreversible electroporation in the undesirable tissue **48**.

This procedure may be repeated to destroy relatively larger portions of the undesirable tissue **48**. The position **60** may be taken as a pivot point about which the first electrode **24***a* may be rotated in an arc of radius "r," the distance between the first and second electrodes **24***a*, **24***b*. Prior to rotating about the second electrode **24***b*, the first electrode **24***a* is retracted by pulling on the slide member **30** (FIGS. **1** and **2**A-D) in a direction towards the proximal end and rotating the electrical ablation device **20** about the pivot point formed at position **60** by the second electrode **24***b*. Once the first electrode **24***a* is rotated to a second position **58***b*, it is advanced to engage the undesirable tissue **48** at point **58***b* by pushing on the slide member **30** in a direction towards the distal end. A second necrotic zone **65***b* is formed upon energizing the first and second electrodes **24***a*, **24***b*. A third necrotic zone **65***c* is formed by retracting the first electrode **24***a*, pivoting about pivot point **60** and rotating the first electrode **24***a* to a new location, advancing the first electrode **24***a* into the undesirable tissue **48** and energizing the first and second electrodes **24***a*, **24***b*. This process may be repeated as often as necessary to create any number of necrotic zones **65***p*, where p is any positive integer, within multiple circular areas of radius "r," for example, that is suitable to ablate the entire undesirable tissue **48** region. At anytime, the surgeon or clinician can reposition the first and second electrodes **24***a*, **24***b* and begin the process anew. Similar techniques may be employed to ablate any other undesirable tissues that may be accessible trans-anally through the colon, and/or orally through the esophagus and the stomach using translumenal access techniques. Therefore, the embodiments are not limited in this context.

FIG. **5** illustrates a detailed view of one embodiment of the electrical ablation system **10** shown in FIG. **4** in use to treat undesirable tissue **48** located in the liver **50**. The first and second electrodes **24***a*, **24***b* are embedded into or proximate the undesirable tissue **48** on the liver **50**. The first and second electrodes **24***a*, **24***b* are energized to deliver one or more electrical pulses of amplitude and length sufficient to induce irreversible electroporation in the undesirable tissue **48** and create the first necrotic zone **65***a*. Additional electric pulses may be applied to the tissue immediately surrounding the respective electrodes **24***a*, **24***b* to form second, thermal, necrotic zones **63***a,b* near the electrode-tissue-interface. The duration of an irreversible electroporation energy pulse determines whether the temperature of the tissue **63***a,b* immediately surrounding the respective electrodes **24***a*, **24***b* raises to a level sufficient to create thermal necrosis. As previously described, varying the electrode **24***a*, **24***b* size and spacing can control the size and shape of irreversible electroporation induced necrotic zone **65***a*. Electric pulse amplitude and length can be varied to control the size and shape of the thermally induced necrotic zones near the tissue-electrode-interface.

Referring to FIGS. **6-8**, in one embodiment, a probe guide **100** can be structured to guide electrodes, such as electrodes **824***a*, **824***b*, **824***c*, **824***d* (FIG. **3**), in or proximal to a tissue treatment region. In various embodiments, the probe guide **100** can maintain the parallel alignment of the electrodes **824***a*, **824***b*, **824***c*, **824***d*, for example, and/or maintain a predetermined distance or gap between the electrodes **824***a*, **824***b*, **824***c*, **824***d*, for example. In some embodiments, the probe guide **100** can comprise a body portion **102** and, in various embodiments, the body portion **102** can comprise at least two passages, such as first passage **104***a* and second passage **104***b*, which can extend through the body portion **102**. The passages **104***a*, **104***b* can extend through the body portion **102** from a first or proximal surface **106** to a second or tissue contacting surface **108**, for example. The first passage **104***a* can be structured to axially restrain the first electrode **824***a*, for example, and the second passage **104***b* can be structured to axially restrain the second electrode **824***b*, for example. Furthermore, in various embodiments, the first passage **104***a* can be parallel or substantially parallel to the second passage **104***b*. Referring primarily to FIG. **8**, an axis A can pass through each passage **104***a*, **104***b*, for example. In various embodiments, the axis A can define the central axis of each passage **104***a*, **104***b*. The axes A defining the first and second passages **104***a*, **104***b* can be separated by a predetermined distance or gap of approximately 1.0 cm to approximately 2.5 cm, for example. In some embodiments, the axes defining the first and second passages **104***a*, **104***b* can be separated by approximately 1.5 cm, for example.

In various embodiments the first passage **104***a* can be structured to axially restrain the first electrode **824***a* and the second passage **104***b* can be structured to axially restrain the second electrode **824***b*, for example. In some embodiments, the first and second electrodes **824***a*, **824***b* can comprise a proximal end and a distal end. In at least one embodiment, the distal end of the first electrode **824***a* can be spaced a predetermined distance from the distal end of the second electrode **824***b* when the first electrode **824***a* is restrained in the first passage **104***a* and the second electrode **824***b* is axially restrained in the second passage **104***b*, for example. The predetermined distance between the distal ends of the first and second electrodes **824***a*, **824***b* can correspond to a treatment distance in the tissue treatment region. In various embodiments, as described herein, the distal ends of the first and second electrodes **824***a*, **824***b* can be operably structured to conduct current therebetween when at least one of the first and second electrodes **824***a*, **824***b* is energized by an energy source **14** (FIG. **3**). In various embodiments, the energy source **14** can comprise a radio frequency energy source, a pulsed radio frequency energy source, an irreversible electroporation energy source and/or a pulsed irreversible electroporation energy source, for example. In some embodiments, the current conducted between the distal ends of the first and second electrodes **824***a*, **824***b* can be selected to generate an electric field of approximately 1500 volts per centimeter, for example.

In at least one embodiment, the body portion **102** can comprise at least four passages, such as the first passage **104***a*, the second passage **104***b*, a third passage **104***b* and a fourth passage **104***d*; the passages **104***a*, **104***b*, **104***c*, **104***d* can extend through the body portion **102** from the first surface **106** to the second surface **108**, for example. The first passage **104***a* can be structured to axially restrain the first electrode **824***a*, for example, the second passage **104***b* can be structured to axially restrain the second electrode **824***b*, for example, the third passage **104***c* can be structured to axially restrain the third electrode **824***c*, for example, and the fourth passage **104***d* can be structured to axially restrain the fourth electrode **824***d*, for example. In various embodiments the passages **104***a*, **104***b*, **104***c*, **104***d* through the body portion **102** of the probe guide **100** can be parallel and/or substantially parallel. Furthermore, as described herein, an energy source **14** (FIG. **3**) can be structured to operably energize at least one of the electrodes **824***a*, **824***b*, **824***c*, **824***d* such that the electrodes **824***a*, **824***b*, **824***c*, **824***d* conduct current therebetween.

Referring primarily to the embodiment illustrated in FIG. **6**, an axis A can pass through each passage **104***a*, **104***b*, **104***c*, **104***d*, for example. In various embodiments, an axis A can define the central axis of each passage **104***a*, **104***b*. The axes A defining the passages **104***a*, **104***b*, **104***c*, **104***d* can be separated by predetermined distance or gap of approximately 1.0 cm to approximately 2.5 cm, for example. In at least one embodiment, the axes defining the first and second passages **104***a*, **104***b* can be separated by approximately 1.5 cm, for example, the axes defining the second and third passages **104***b*, **104***c* can be separated by approximately 1.5 cm, for example, the axes defining the third and fourth passages **104***c*, **104** can be separated by approximately 1.5 cm, for example, and the axes defining the fourth and first passages **104***d*, **104***a* can be separated by approximately 1.5 cm, for example. In at least one embodiment, the axes defining the first and third passages **104***a*, **104***c* can be separated by approximately 2.5 cm, for example. In various embodiments, the predetermined distances between the passages **104***a*, **104***b*, **104***c*, **104***d* may be equidistant or substantially equidistant. In other embodiments, the at least two predetermined distances between the passages **104***a*, **104***b*, **104***c*, **104***d* can be different. In various embodiments, the axes defining the passages **104***a*, **104***b*, **104***c*, **104***d* can correspond with the edges of a parallelogram in the body portion **102** of the probe guide **100**, for example. In various embodiments, the parallelogram can be substantially cubic and/or rectangular, for example. Referring primarily to FIG. **8**, the passages **104***a*, **104***b* can comprise an inner surface **118** that define the bores through the body portion **102** of the probe guide **100**. In various embodiments, referring to FIG. **8**, for example, the inner surface can comprise a radiopaque material such as, for example, a metallic sleeve or a metallic surface coating. In various embodiments, the inner surface **118** can comprise a longitudinal track **120** that comprises the radiopaque material, for example, an embedded metal wire or rod, or a metal sleeve filled with plastic.

In some embodiments, the probe guide **100** can comprise a rim **114** at and/or near the first surface **106** of the probe guide **100**. In various embodiments, the probe guide **100** can also comprise a base **110** at and/or near the second surface **108** of the probe guide **100**. In some embodiments, the base **110** and/or the rim **114** can comprise a substantially circular, elliptical or polygonal perimeter. For example, the base **110** can comprise a circular perimeter **112**. The base **110** and/or the rim **114** can comprise a wider cross-sectional area than the body portion **102** of the probe guide **100**, for example. Furthermore, the base **110** and/or the rim **114** can extend peripherally from an outer surface **126** of the body portion **102** of the probe guide **100**, for example. In various embodiments, the probe guide **100** can also comprise an extension **116** extending from the body portion **102**. In various embodiments, the extension **116** can comprise the second or tissue contacting surface **108** of the probe guide **100**. The extension **116** can comprise a cross-sectional area that is smaller than, larger than, or approximately equal to the cross-sectional area of the base **110** and/or the body portion **102**, for example.

During use, an operator may desire to position multiple electrodes, such as the first electrode **824***a*, the second electrode **824***b*, the third electrode **824***c*, and/or the fourth electrode **824***d* in or proximal to a tissue treatment region. Further, the operator may desire that the electrodes **824***a*, **824***b*, **824***c*, and/or **824***d* are separated by a predetermined distance or distances when positioned in or proximal to the tissue treatment region, for example. In some embodiments, the probe guide **100** can comprise a predetermined distance or distances between the passages **104***a*, **104***b*, **104***c*, and/or **104***d*, for example, which can correspond with a preferred treatment distance or distances between the electrodes **824***a*, **824***b*, **824***c*, and/or **824***d*, for example. In various embodiments, the operator can position the probe guide **100** relative to the tissue treatment region. In at least one embodiment, the second surface **108** and/or the base **110** of the probe guide **100** can be positioned adjacent to, abutting and/or against tissue in or proximal to the tissue treatment region. The first electrode **824***a* can be axially advanced through the first passage **104***a* of the probe guide **100**, for example. In various embodiments, the first electrode **824***a* can pierce or puncture tissue to arrive at a preferred first position in the tissue treatment region. In some embodiments, the first electrode **824***a* can be positioned relative to the tissue treatment region and, subsequently, the first electrode **824***a* can be positioned within the first passage **104***a* of the probe guide **100**, In at least one embodiment, the probe guide **100** can then be axially moved along the first electrode **824***a* towards a distal position on the first electrode **824***a*, in which the probe guide **100** is positioned adjacent to, against, and/or abutting tissue in or proximal to the tissue treatment region.

When the first electrode **824***a* and the probe guide **100** are appropriately positioned relative to tissue in the tissue treatment region, the distal end of the second electrode **824***b* can be axially advanced through the second passage **104***b* of the probe guide **100**, for example. As the distal end of the second electrode **824***b* is advanced through the second passage **104***b*, the second passage **1804***b* can guide the second electrode **824***b* a predetermined distance from the distal end of the first electrode **824***a*, for example, and/or along a path parallel or substantially parallel to the first electrode **824***a*, for example. In various embodiments, the distal end of the third electrode **824***c* can be similarly advanced through the third passage **104***c* of the probe guide **100** and/or the distal end of the fourth electrode **824***d* can be similarly advanced through the fourth passage **104***d* of the probe guide. The second electrode **824***b*, the third electrode **824***c*, and the fourth electrode **824***d* can be advanced simultaneously, consecutively, or a combination thereof. As the distal end of the third electrode **824***c* is advanced through the third passage **104***c*, the third passage **104***c* can guide the third electrode **824***c* a predetermined distance from the distal end of the first electrode **824***a* and/or the second electrode **824***b*, for example, and/or along a path parallel or substantially parallel to the first electrode **824***a* and/or the second electrode **824***b*, for example. Similarly, as the distal end of the fourth electrode **824***d* is advanced through the fourth passage **104***d*, the fourth passage **104***d* can guide the fourth electrode **824***d* a predetermined distance from the distal end of the first electrode **824***a*, the second electrode **824***b* and/or the third electrode **824***c*, for example, and/or along a path parallel or substantially parallel to the first electrode **824***a*, the second electrode **824***b* and/or the third electrode **824***c*, for example. Once the electrodes **824***a*, **824***b*, **824***c*, **824***d* are positioned in the tissue treatment region, the electrodes **824***a*, **824***b*, **824***c*, **824***d* can define a first target treatment zone or necrotic zone **65***a* (FIG. **4**) in the tissue treatment region.

As described herein, in particular with the embodiments of the electrodes illustrated in FIG. **3**, at least one electrode **824***a*, **824***b*, **824***c*, **824***d* can be energized by an energy source **14** such that the electrodes **824***a*, **824***b*, **824***c*, **824***d* conduct current therebetween. In various embodiments, the current can non-thermally ablate tissue in the first target treatment zone in the tissue treatment region, for example. In some embodiments, the electrodes **824***a*, **824***b*, **824***c*, **824***d* can be withdrawn from the probe guide **100**, which can then be repositioned relative to the tissue treatment region, for example. The probe guide **100** can be pivoted and/or translated, for example. In various embodiments, the electrodes **824***a*, **824***b*, **824***c*, **824***d* can then be re-advanced through the passages **104***a*, **104***b*, **104***c*, **104***d* to treat tissue in a second target treatment zone in the tissue treatment region, for example. The process can be repeated for a multiple target treatment zones until all tissue in the tissue treatment region has been treated by the electrical ablation device **800** (FIG. **3**), for example.

Referring now to FIG. **56**, in one embodiment, a probe guide **150** can comprise a body portion **152** having a plurality of passages, such as first passage **154***a*, second passage **154***b*, third passage **154***c*, and fourth passage **154***d*; the passages **154***a*, **154***b*, **154***c*, **154***d* can extend through the body portion **152** from a first surface **156** to a second or tissue contacting surface, for example. In various embodiments, the body portion **152** can be substantially rectangular and may comprise rounded corners, for example. The first passage **154***a* can be structured to axially restrain the first electrode **824***a*, for example, the second passage **154***b* can be structured to axially restrain the second electrode **824***b*, for example, the third passage **154***c* can be structured to axially restrain the third electrode **824***c*, for example, and the fourth passage **154***d* can be structured to axially restrain the fourth electrode **824***d*, for example. Similar to embodiments described herein, the passages **154***a*, **154***b*, **154***c*, **154***d* through the body portion **152** of the probe guide **150** can be parallel and/or substantially parallel and can be separated by a predetermined distance or distances of approximately 1.0 cm to 2.5 cm, for example. Furthermore, as described herein, an energy source **14** (FIG. **3**) can be structured to operably energize at least one of the electrodes **824***a*, **824***b*, **824***c*, **824***d* such that the electrodes **824***a*, **824***b*, **824***c*, **824***d* conduct current therebetween.

In the embodiment illustrated in FIG. **56**, the body portion **152** can comprise an outer surface **176**. In at least one embodiment, the outer surface **176** can comprise a contour **172** directed into the body portion **152**, for example. In various embodiments, the outer surface **176** can comprise a plurality of contours **172**. The body portion **152** can comprise a first contour **172** on a first side of the body portion **152**, for example, and a second contour **172** on a second side of the body portion **152**, for example. In various embodiments, the contour **172** on the first side of the body **152** can extend into the body **152** towards the contour **172** on the second side of the body portion **152**, for example. The contour(s) **172** can provide a gripping surface for the operator to grasp, position, and/or hold the probe guide **150** relative to tissue in the tissue treatment region. In some embodiments, the probe guide **150** can also comprise a rim and/or a base **162**, which can be similar to rim **114** and base **110**, described in herein.

Referring now to FIGS. **9** and **10**, in one embodiment, a probe guide **200** can comprise a body portion **202** and a handle **224**, for example. In various embodiments, the body portion **202** can comprise a plurality of passages, such as first passage **204***a*, second passage **204***b*, third passage **204***b* and fourth passage **204***d*; the passages **204***a*, **204***b*, **204***c*, **204***d* can extend through the body portion **202** from a first surface **206** to a second or tissue contacting surface **208**, for example. The first passage **204***a* can be structured to axially restrain the first electrode **824***a*, for example, the second passage **204***b* can be structured to axially restrain the second electrode **824***b*, for example, the third passage **204***c* can be structured to axially restrain the third electrode **824***c*, for example, and the fourth passage **204***d* can be structured to axially restrain the fourth electrode **824***d*, for example. Similar to embodiments described herein, the passages **204***a*, **204***b*, **204***c*, **204***d* through the body portion **102** of the probe guide **100** can be parallel and/or substantially parallel and can be separated by a predetermined distance or distances of approximately 1.0 cm to 2.5 cm, for example. Furthermore, as described herein, an energy source **14** (FIG. **3**) can be structured to operably energize at least one of the electrodes **824***a*, **824***b*, **824***c*, **824***d* such that the electrodes **824***a*, **824***b*, **824***c*, **824***d* conduct current therebetween.

In the embodiments illustrated in FIGS. **9** and **10**, the body portion **202** can comprise an outer surface **226**. In at least one embodiment, the outer surface **226** can comprise a contour **222** directed into the body portion **202**, for example. In various embodiments, the outer surface **226** can comprise a plurality of contours **222**. The body portion **202** can comprise a first contour **222** on a first side of the body portion **202**, for example, and a second contour **222** on a second side of the body portion **202**, for example. In various embodiments, the contour **222** on the first side of the body **202** can extend into the body **202** towards the contour **222** on the second side of the body portion **202**, for example. In some embodiments, the probe guide **200** can also comprise a rim **214** and/or a base, such as rim **114** and base **110**, described in herein. In various embodiments, the probe guide **200** can comprise a handle **224** extending from the body portion **202** of the probe guide **200**. The handle **224** can comprise a substantially accurate profile, for example, a substantially flat profile, for example, or a combination thereof. In various embodiments, the handle **224** can comprise an ergonomic shape or grip.

Similar to other embodiments described herein, the probe guide **200**, illustrated in FIGS. **9** and **10**, for example, can be positioned in or proximal to the tissue treatment region. In various embodiments, the tissue contacting surface **208** can be positioned adjacent to, against, and/or abutting tissue in the tissue treatment region, for example. In various embodiments, the handle **224** and/or the contours **222** can facilitate accurate positioning of the body portion **202** of the probe guide **200** relative to a target treatment zone in the tissue treatment region. Similar to other embodiments, once the probe guide **200** is positioned relative to the tissue treatment region, the first electrode **824***a* can be advanced through the first passage **204***a*, for example, the second electrode **824***b* can be advanced through the second passage **204***b*, for example, the third electrode **824***c* can be advanced through the third passage **204***c*, for example, and/or the fourth electrode **824***d* can be advanced though the fourth passage **204***d*, for example. In various embodiments, the handle **224** and/or contours **222** can facilitate steadiness of the body portion **202** of the probe guide **200** relative to the tissue treatment region as the electrodes **824***a*, **824***b*, **824***c* and/or **824***d* are advanced through the passages **204***a*, **204***b*, **204***c* and/or **204***d* of the body portion **202**.

In various embodiments, referring primarily to FIG. **11**, in one embodiment, a probe guide **300** can comprise a substantially cylindrical body **302** having a first or top surface **306** and a second or bottom surface **308**. In various embodiments, at least one surface **306**, **308** can comprise a substantially conical shape. Referring to FIG. **11**, the first surface **306** can comprise a substantially conical shape, for example. The probe guide **300** can also comprise a plurality of passages **304***a*, **304***b*, **304***c*, **304***d* configured to axially restrain the electrodes **824***a*, **824***b*, **824***c*, **824***d*, similar to other embodiments described herein. In various embodiments, the cylindrical body **302** can comprise a plurality of openings or channels **316** therethrough. For example, four openings **316** can extend from the first, conical surface **306** through the body **302** to the second surface **308**, for example. The openings **316** can provide a channel for heat and/steam to escape or vent from the tissue treatment region, for example, when current is conducted between the electrodes **824***a*, **824***b*, **824***c*, **824***d*, as described herein. In various embodiments, the guide **300** can also comprise a central bore **314**. In some embodiments, the central bore **314** can provide the clinician with a central reference point for positioning the probe guide **300** and the electrode probes **824***a*, **824***b*, **824***c* and/or **824***d* relative to a target treatment zone in a tissue treatment region. For example, the central bore **314** can be positioned at or near a central position in the target treatment zone. The electrodes **824***a*, **824***b*, **824***c*, and/or **824***d* can be positioned within the passages **204***a*, **204***b*, **204***c*, and/or **204***d* of the probe guide **400** such that the electrodes **824***a*, **824***b*, **824***c*, and/or **824***d* surround the central position in the target treatment zone, for example.

Referring now to FIGS. **12-14**, in one embodiment, a probe guide **400** can comprise the cylindrical body **302** described herein. In various embodiments, the probe guide

400 can also comprise a base **410**. The base **410** can extend from the second or bottom surface **308** of the cylindrical body **302**, for example. In some embodiments, the base **410** can be connected to the body portion **302** by flanges or ribs **420**. In various embodiments, at least two ribs **420** can extend from the cylindrical body **302** to the base **410**, for example. In other embodiments, at least four ribs **420** can extend between the base **410** and the cylindrical body **302**. In such embodiments, a space or gap can be positioned between portions of the cylindrical body **302** and portions of the base **410**, for example. In other embodiments, the base **410** can peripherally extend from the cylindrical body **302** such that no spaces or gaps are positioned between the cylindrical body **302** and the base **410**. In various embodiments, the base **410** can comprise a tissue contacting surface **408** (FIG. **13**) that is structured to operably abut tissue when the electrodes **824***a*, **824***b*, **824***c*, **824***d* are positioned relative to a tissue treatment region, as described herein. In at least one embodiment, the tissue contacting surface **408** of the base **410** can help to steady the cylindrical body **302** relative to the tissue treatment region.

Referring to FIG. **15**, in one embodiment, a probe guide **500** can comprise a body portion **502** and, in various embodiments, a plurality of passages can extend through the body portion **502**. The passages can extend from a first or top surface **506** to a second or tissue contacting surface (not shown), for example. In some embodiments, two passages, such as a first passage **504***a* and a second passage **504***b*, can extend through the body portion **502**. In other embodiments, at least four passages, such as passages **504***a*, **504***b*, **504***c*, **504***d*, can extend through the body portion **502** from the first surface **506** to the second surface. The passages **504***a*, **504***b*, **504***c*, **504***d* can be configured to axially restrain the electrodes **824***a*, **824***b*, **824***c*, **824***d*, for example, and/or guide the electrodes **824***a*, **824***b*, **824***c*, **824***d* in parallel or substantially parallel alignment, for example, similar to other embodiments described herein.

In various embodiments, the body portion **502** can comprise an outer surface **526**. In some embodiments, at least one contour **522** can extend into the body portion **502** from the outer surface **526**, for example. The contour **522** can be structured to provide a grip and holding means for the clinician to engage when positioning and/or steadying the probe guide **500** relative to the tissue treatment region. In various embodiments, a contour **522** can be positioned on a first side of the body **502** and another contour **522** can be positioned on a second side of the body portion **502**, for example. Referring still to FIG. **15**, in various embodiments, the passages **504***a*, **504***b*, **504***c*, **504***d* through the body portion **502** can be clustered together at or near a first end **514** of the body portion **502**. In such embodiments, a section of the body portion **502** can extend away from the passages **504***a*, **504***b*, **504***c*, **504***d* and towards a second end **516** of the body portion **502**. In some embodiments, a significant section of the body **502** can extend away from the passages **504***a*, **504***b*, **504***c*, **504***d* and towards the second end **516**. In various embodiments, the body portion **502** at the second end **516** can provide a significant tissue contacting surface (not shown) to position against tissue in the tissue treatment region, for example. In at least one embodiment, at least one contour **522** in the outer surface **526** of the body portion **502** can be position at or near the second end **516** and around the tissue contacting surface of the body **502**. The extended tissue contacting surface and/or contours **522** can help the operator position and/or steady the probe guide **500** relative to the tissue treatment region.

Referring now to FIG. **16**, in one embodiment, a probe guide **600** can comprise the body portion **502** as described herein. In the embodiments illustrated in FIG. **16**, the probe guide **600** can also comprise a base **610** that extends from the body portion **502**, for example. In various embodiments, the base **610** can be pivotally connected to the body portion **502**. The base **610** can be pivotally connected to the body portion **502** by a pivot joint, pivot pin, and/or pivot shaft, for example. In various embodiments, a pivot shaft such as pivot shaft **612** can extend between the base **610** and the body portion **502** to enable pivoting of the body portion **502** relative to the base **610**. In such embodiments, a tissue contacting surface (not shown) on the base **610** can be positioned adjacent to, abutting and/or against tissue in the tissue treatment region; furthermore, the body portion **502**, including the passages **504***a*, **504***b*, **504***c*, **504***d* therethrough, can pivot relative to the base **610**.

Similar to other embodiments described herein, the probe guide **600** can be positioned relative to the tissue treatment region and the first electrode **824***a* can be axially advanced through the first passage **504***a*, for example. In various embodiments, the contours **522** can help the operator engage or grip the body portion **602** of the probe guide **600** and position the body portion **602** relative to the first target treatment zone in the tissue treatment region. As described herein, once the probe guide **600** and the first electrode **824***a* are positioned relative to the tissue treatment region, the second electrode **824***b* can be advanced through the second passage **504***b*, for example, the third electrode **824***c* can be advanced through the third passage **504***c*, for example, and/or the fourth electrode **824***d* can be advanced though the fourth passage **504***d*, for example. The electrodes **824***a*, **824***b*, **824***c*, **824***d* can be positioned relative to the tissue treatment region such that a current conducted therebetween treats tissue in a first target zone.

In various embodiments, the electrodes **824***a*, **824***b*, **824***c*, **824***d* can be withdrawn from the body portion **502** of the probe guide **600** and from the first target treatment zone. The body portion **502** of the probe guide **600** and the passages **504***a*, **504***b*, **504***c*, **504***d* therethrough can pivot on the pivot shaft **612** relative to the base **610**. In such embodiments, the tissue contacting surface on the base **610** can remain stationary or significantly stationary relative to the tissue treatment region. In other embodiments, referring again to the embodiment illustrated in FIG. **15**, the tissue contacting surface on the body portion **502** can be lifted and/or pivoted relative to the tissue treatment region, for example. In various embodiments, once the body portion **502** of the probe guide **600** has pivoted to a new position, the electrodes **824***a*, **824***b*, **824***c*, **824***d* can be axially advanced through the passages **504***a*, **504***b*, **504***c*, **504***d*, respectively, as described herein. In various embodiments, the electrodes **824***a*, **824***b*, **824***c*, **824***d* can be positioned relative to the tissue treatment region such that a current conducted therebetween treats tissue in a second target treatment zone. In at least one embodiment, the electrodes **824***a*, **824***b*, **824***c*, **824***d* can be re-withdrawn, the body portion **502** can pivot, and the electrodes **824***a*, **824***b*, **824***c*, **824***d* can be re-advanced to treat tissue in another target treatment zone. In some embodiments, the process can be repeated until tissue throughout the tissue treatment region has been treated by the electrical ablation device **800** (FIG. **3**), for example.

Referring to FIG. **17**, in one embodiment, a probe guide **700** can comprise a first body portion **701** and a second body portion **702**. In various embodiments, a first passage **703** can extend through the first body portion, for example, and a second passage **704** can extend through the second body portion **702**, for example. In various embodiments, the first passage **703** can be structured to axially restrain the first electrode **24***a* (FIG. **1**), for example, and the second passage **704** can be structured to axially restrain the second electrode **24***b*, for example. In some embodiments, the distal end of the first electrode **24***a* can be spaced a predetermined distance from the distal end of the second electrode **24***b* when the first electrode **24***a* is axially restrained in the first passage **703** and the second electrode **24***b* is axially restrained in the second passage **704**. Further, the predetermined distance between the distal ends of the first and second electrodes **24***a*, **24***b* can correspond to a treatment distance in the tissue treatment region. The distal ends of the first and second electrodes **24***a*, **24***b* can be operatively structured to conduct currents therebetween when at least one of the first and second electrodes **24***a*, **24***b* is energized by an energy source **14** (FIG. **1**), for example.

In the embodiments illustrated in FIG. **17**, a connecting portion or flange **714** can connect the first body portion **701** and the second body portion **702**. The length of the connecting portion **714** can affect the predetermined distance between the first and second passages **703**, **704**, for example. In various embodiments, the first and/or second body portions **701**, **702** can comprise as substantially cylindrical shape. In at least one embodiment, the first body portion **701** can comprise a semi-cylindrical shape and a triangular shape, for example. The height of the first body portion **701** can be greater than, less than, or substantially equal to the height of the second body portion **702**. In various embodiments, the connecting portion **714** can comprise a sloped or angled surface that connects the first and second body portions **701**, **702**.

In various embodiments, the first body portion **701** can comprise a first slot **716** extending from the first passage **703** to an outer surface **706** of the first body portion **701**. The first slot **716** can reach the outer surface **706** at a first outlet **708**, for example. In various embodiments, the first electrode **24***a* (FIG. **1**) can be axially restrained in the first passage **703**. Further, the first electrode **24***a* can be removed from the first passage **703** through the first slot **716** in the first body portion **701**. In various embodiments, the first passage **703** can comprise a first width and the first slot **716** can comprise a minimum width. In various embodiments, the minimum width of the first slot **716** can substantially equal the first width of the first passage **703**. In such embodiments, the first electrode **24***a* can easily and smoothly move in and out of the first passage **703** through the first slot **716**. In other embodiments, the minimum width of the first slot **716** can be less than or greater than the first width of the first passage **703**. In embodiments where the minimum width of the first slot **716** is less than the first width of the first passage **703**, the first slot **716** can restrict movement of the first electrode **24***a* in and/or out of the first passage **703**. In various embodiments, the first electrode **24***a* must be aligned with the first slot **716** and pulled through the first slot **716** to move the first electrode **24***a* into and/or out of first passage **703** of the first body portion **701**. In some embodiments, a force must be applied to move the first electrode **24***a* in and/or out of the first passage **703**.

Similarly, in various embodiments, the second body portion **702** can comprise a second slot **718** extending from the second passage **704** to an outer surface **710** of the second body portion **702**. The second slot **718** can reach the outer surface **710** at a second outlet **712**, for example. In various embodiments, the second electrode **24***b* (FIG. **1**) can be axially restrained in the second passage **704**. Further, the second electrode **24***b* can be removed from the second passage **704** through the second slot **718** in the second body portion **702**. In various embodiments, the second passage **704** can comprise a second width and the second slot **718** can comprise a minimum width. In various embodiments, the minimum width of the second slot **718** can substantially equal the second width of the second passage **704**. In such embodiments, the second electrode **24***b* can easily and smoothly move in and out of the second passage **704** through the second slot **718**. In other embodiments, the minimum width of the second slot **718** can be less than or greater than the second width of the second passage **704**. In embodiments where the minimum width of the second slot **718** is less than the second width of the second passage **707**, the second slot **718** can restrict movement of the second electrode **24***b* in and/or out of the second passage **704**. In various embodiments, the second electrode **24***b* must be aligned with the second slot **718** and pulled through the second slot **718** to move the second electrode **24***b* into and/or out of second passage **704** of the second body portion **702**. In some embodiments, a force must be applied to move the second electrode **24***b* in and/or out of the second passage **704**.

In various embodiments, the first slot **716** can be substantially orthogonal to the second slot **718**, for example. In other embodiments, the slots **716**, **718** can be substantially aligned and/or angularly offset from each other by less than or more than approximately 90 degrees, for example. In various embodiments, at least one of the first and second slots **716**, **718** can be substantially flared. The first slot **716** can be flared such that the first slot **716** widens as the first slot **716** extends from the first passage **703** to the outer surface **706**, for example. Additionally or alternatively, the second slot **718** can be flared such that the second slot **718** widens as the second slot **718** extends from the second passage **704** to the outer surface **710**, for example. In various embodiments, an orthogonal or angled arrangement of the entry outlets **708**, **712** can facilitate entry and/or repositioning of the electrodes **24***a*, **24***b*, relative to the tissue treatment region.

Similar to the embodiments described herein in connection with FIGS. **6**-**16**, for example, the probe guide **700** can be positioned relative to this tissue treatment region and the first and second electrodes **24***a*, **24***b* can be axially advanced through the first and second passages **703**, **704**, respectively. The first and second electrodes **24***a*, **24***b* can be positioned in the tissue treatment region and the first and second passages **703**, **704** can maintain parallel alignment of the first and second electrodes **24***a*, **24***b*, for example, and/or maintain a predetermined treatment distance. As described herein, current can be conducted between the first and second electrodes **24***a*, **24***b* to treat tissue in the target treatment zone positioned therebetween. In various embodiments, at least one of the first and second electrodes **24***a*, **24***b* can be withdrawn from its respective passage **703**, **704** and moved to another position. For example, the second electrode **24***b* can be removed from the second passage **704** through the second slot **718**, for example. The second body portion **702** can then be pivoted relative to the first body portion **701** before the second electrode **24***b* is axially advanced through the second passage **704** and into the tissue treatment region, for example. In various embodiments, the minimum width of the first slot **716** can prevent the first electrode **24***a* from moving out of the first passage **703** as the second body portion **702** pivots relative thereto.

In various embodiments, the first and second body portions **701**, **702** of the probe guide **700** can be positioned relative to the tissue treatment region before the first and/or second electrodes **24***a*, **24***b* are positioned relative to the tissue treatment region. For example, when the probe guide **700** is positioned relative to a tissue treatment region, the first electrode **24***a* can be axially advanced through the first passage **703** or moved through the first slot **706** into the first passage **703**, for example. In various embodiments, the flanged shape of the first slot **716** and facilitate entry of the first electrode through the minimum width of the first slot **716** and into the first passage **703**, for example. The second electrode **24***b* can then be drawn through the second slot **718** and into the second passage **704**, for example.

Referring to FIG. **18**, a probe guide **850** can comprise the second body portion **702** and connecting flange **714** as described herein. Further, in various embodiments, the probe guide **850** can comprise a first body portion **801**. The first body portion **801** can comprise a first passage **803** structured to axially restrain a first electrode, for example. The first passage **803** need not comprise a slot and/or outlet to an outer surface **806** of the first body portion **800**, for example. In such embodiments, similar to the embodiments described herein, once the first electrode **24***a* and the first body portion **801** are positioned relative to the tissue treatment region, the second body portion **702** can be pivoted relative to the first body portion **801** such that the passages **803**, **704** are appropriately positioned relative to the tissue treatment region. In various embodiments, the second electrode can be axially advanced through the second passage **704** and/or laterally advanced through the second slot **718** and current can be conducted through the distal ends of the first and second electrodes **24***a*, **24***b* to treat tissue therebetween. In various embodiments, the second electrode can then be axially withdrawn through the second passage **704** and/or laterally withdrawn through the second slot **718**, for example. In some embodiments, the second body portion **702** can then be pivoted relative to the first body portion **801** before the second electrode **24***b* is re-advanced through the second body portion **702** to treat another tissue zone in the tissue treatment region.

Referring to FIG. **19**, in one embodiment, a probe guide **900** can comprise a body **902** having an outer perimeter **906**. The probe guide **900** can comprise a substantially flat disc and/or may comprise a substantial height. In various embodiments, the outer perimeter **906** can comprise a plurality of contours **908**. The perimeter **906** can comprise a first contour **908***a*, a second contour **908***b*, a third contour **908***c*, a fourth contour **908***d*, and a fifth contour **908***e*, for example. In various embodiments, the body **902** can comprise a passage **904** structured to axially restrain the first electrode **24***a*. A groove **920** can extend between the passage **904** and the outer perimeter **906** of the body **902**, for example. In various embodiments, the groove **920** can be structured to permit movement of the first electrode **24***a* therethrough. In various embodiments, a radius R can extend from the passage **904** to the outer perimeter **906** of the body **902**. In some embodiments, the radius R can vary at each contour **908** around the outer perimeter **906** of the body **902**. For example, a first radius R_a can extend between the passage **904** and the first contour **908***a*, for example, a second radius R_b can extend from the passage **904** to the second contour **908***b*, for example, and a third radius R_b can extend from the passage **904** to the third contour **908***c*, for example.

In various embodiments, as described herein, a second electrode **24***b* can be positioned along a contour **908** of the perimeter **906**. Furthermore, in various embodiments, a distal end of the first electrode **24***a* can be spaced from a distal end of the second electrode **24***b* by the variable radius R when the first electrode **24***a* is axially restrained in the passage **904** and the second electrode **24***b* is positioned along a contour **908** of the outer perimeter **906**, for example. In various embodiments, the probe guide **900** can hold the electrodes **24***a*, **24***b* in axial alignment with each other when the first electrode **24***a* is axially restrained in the passage **904** and the second electrode **24***b* is positioned along a contour **908**. Further, in various embodiments, the radius R can correspond to a treatment distance in the tissue treatment region. Furthermore, as described herein, the distal ends of the first and second electrodes **24***a*, **24***b* can be operatively structured to conduct current therebetween when at least one of the first and second electrodes **24***a*, **24***b* is energized by an energy source **14** (FIG. **1**).

In various embodiments, the body **902** can also comprise a plurality of traversing edges **910**. In various embodiments, a traversing edge **910** can be positioned between two adjacent contours **908** around the perimeter **906** of the body **902**. A traversing edge **910** can be positioned between the first and second contours **908***a*, **908***b*, for example. In various embodiments, the traversing edge **910** can comprise a substantially straight edge. In other embodiments, the traversing edge **910** can comprise a curve or contour. In some embodiments, a curved traversing edge can correspond with the perimeter of the second electrode **24***b* such that the curved traversing edge can receive and hold the second electrode **24***b* in position along a contour **908** of the outer perimeter **906**. Furthermore referring still to FIG. **19**, the probe guide **900** can comprise indicia of measurements **612** that enable the operator to determine the treatment distance between the first electrode and the second electrode. For example, the electrode probe guide **900** can comprise length measurement such as centimeters, millimeters and/or inches to indicate the length of the radius around the perimeter **906** of the body **902**. The first radius R_a can correspond to 10 mm, for example, the second radius R_b can correspond to 11 mm, for example, the third radius R_c can correspond to 12 mm, for example, the fourth radius R_d can correspond to 13 mm, for example, and the fifth radius R_e can correspond to 14 mm, for example.

Similar to other embodiments described herein, the first electrode **24***a* can be positioned within the passage **904** of the probe guide **900**. The first electrode **24***a* can laterally traverse the groove **920**, for example, and/or axially translate through the passage **904**, for example, when the probe guide **900** is positioned relative to the tissue treatment region. In various embodiments, once the probe guide **900** and the first electrode **24***a* are positioned relative to the tissue treatment region, the second electrode **24***b* can be positioned along a contour **908** such that the radius R corresponds with the preferred tissue treatment distance. In various embodiments, the electrical ablation device **800** can be used with the probe guide **900**. In such embodiments, the passage **804** can axially restrain the first electrode **824***a* and the second, third and/or fourth electrodes **824***b*, **824***c*, **824***d* can be positioned along a contour of the probe guide **900**, for example. The electrodes **824***a*, **824***b*, **824***c*, **824***d* can be positioned relative to the tissue treatment region such that a current conducted therebetween treats tissue in the target treatment zone of the tissue treatment region.

Referring now to FIGS. **20** and **21**, a probe guide **1000** can comprise a body portion **1002** and a bore **1014** extending therethrough. In various embodiments, the body portion **1002** can comprise a top surface **1006** and a bottom surface (not shown). The bore **1014** can extend from the top surface **1006** to the bottom surface, for example. In various embodiments, the body **1002** can comprise a plurality of enclosures. The body **1002** can have two enclosures **1010***a*, **1010***c*, for example, or four enclosures **1010***a*, **1010***b*, **1010***c*, **1010***d*, for example. The body portion **1002** can comprise a number of enclosures **1010** that equals the number of electrodes that the probe guide **1000** is structured to axially restrain, for example. In various embodiments, a passage **1004***a*, **1004***b*, **1004***c*, **1004***d* can extend through each enclosure **1010***a*, **1010***b*, **1010***c*, **1010***d* from the top surface **1006** to the bottom surface of the body portion **1002**, for example. Similar to the other embodiments described herein, each passage **1004***a*, **1004***b*, **1004***c*, **1004***d* can be structured to axially restrain an electrode positioned therein. Further, the passages **1004***a*, **1004***b*, **1004***c*, **1004***d* can be substantially parallel such that the electrodes **824***a*, **824***b*, **824***c*, **824***d* (FIG. **3**) are held in a parallel or substantially parallel arrangement by the probe guide **1000**, for example. The enclosures **1010***a*, **1010***b*, **1010***c*, **1010***d* can be spaced equidistance or non-equidistance around the perimeter of the body portion **1002**. In some embodiments, the enclosures **1010***a*, **1010***b*, **1010***c*, **1010***d* can be positioned around the perimeter of the body portion **1002** such that the passages **1004***a*, **1004***b*, **1004***c*, **1004***d* through the enclosures **1010***a*, **1010***b*, **1010***c*, **1010***d*, respectively, are positioned a predetermined distance or distances from each other.

In various embodiments, the probe guide **1000** can also comprise a plurality of ribs **1020**. The ribs **1020** can extend between adjacent enclosures **1010** of the body **1002**. In various embodiments, the ribs can laterally traverse between the first enclosure **1010***a* and the fourth enclosure **1010***d*, for example. The probe guide **1000** can also comprise an outer surface **1016**. A plurality of vents **1018** can extend from the outer surface **1016** to the bore **1014** through the body portion **1002**, for example. In various embodiments, the vents **1018** can be positioned between two adjacent ribs **1020** of the body portion **1002**. In various embodiments, the probe guide **1000** can comprise four enclosures **1010** positioned around the perimeter of the body portion **1002**, for example. In various embodiments, a first plurality of ribs and/or vents **1018** can be positioned between the first and fourth enclosures **1010***a*, **1010***d* of the body portion **1002**. Furthermore, a second plurality of ribs **1020** and/or vents **1018** can be positioned between the second and third enclosures **1010***b*, **1010***c* of the body portion **1002**, for example. Referring to FIG. **20**, the body portion **1002** can also comprise a contour or grip **1022**. In various embodiments, the body portion **1002** can comprise a plurality of contours or grips **1022** therein. In some embodiments, a first grip **1022** can be positioned on a first side of the body portion **1002** between the first and fourth enclosures **1010***a*, **1010***d*, for example, and a second grip **1022** can be positioned on a second side of the body portion **1002** between the second and third enclosures **1010***b*, **1010***c*, for example. In various embodiments, the contours **1022** can provide a grip for the operator to engage or hold when placing the probe guide **1000** relative to the tissue treatment region, for example.

Referring now to FIGS. **22-27**, a probe guide **1100** can comprise a body portion **1102**, similar to the body portion **1002** described herein. The body portion **1102** can comprise first, second, third and fourth enclosures **1110***a*, **1110***b*, **1110***c*, **1110***d* similar to enclosures **1010***a*, **1010***b*, **1010***c*, **1010**, for example, and/or first, second, third, and fourth passages **1104***a*, **1104***b*, **1104***c*, **1104***d* similar to passages **1004***a*, **1004***b*, **1004***c*, **1004***d*. The probe guide **1100** can also comprise a handle **1124** and/or a locking element **1132**, for example. In various embodiments, the handle **1124** can be removable. In other embodiments, the handle **1124** can be fixedly secured to the body portion **1102**. Referring primarily to FIG. **23**, the handle **1124** can comprise an extension **1126** that extends from the handle **1124** to a distal portion **1128** thereof. In various embodiments, an orifice **1130** can extend through at least a portion of the extension **1126**, for example. Referring primarily to FIG. **22**, the extension **1126** can be positioned within the body portion **1102** of the probe guide **1100**. In such embodiments, the extension **1126** can be positioned through at least a portion of a proximal opening **1112** (FIG. **26**) in the body portion **1102**, for example. Furthermore, in various embodiments the distal portion **1028** of the handle **1124** can extend through a bore **1114** of the body portion and into a distal opening **1113** (FIG. **25**) in the body portion **1102**, for example. In such embodiments, the orifice **1130** on the extension **1126** of the handle **1124** can be aligned with the bore **1114** of the body portion **1102**. In various embodiments, referring primarily to FIG. **24**, a locking element **1132** can comprise a plunger or shaft **1134** and a rib **1136**. In various embodiments, at least a portion of the locking element **1132** can be positioned within the bore **1114** of the body **1102**. When a portion of the locking element **1132** is positioned within the bore **1114**, the locking element **1132** can secure or lock the handle **1124** to the body portion **1202**, for example. In some embodiments, the plunger **1134** can extend through the orifice **1130** of the handle **1124** to lock the handle **1124** in place.

Similar to embodiments described herein, the probe guide **1100** can be positioned relative to the tissue treatment region and the first electrode **824***a* can be axially advanced through the first passage **1104***a* of the probe guide **1100**, for example. In various embodiments, the handle **1124** and/or contours **1120** can facilitate accurate positioning of the body portion **1102** of the probe guide **1100** relative to the first electrode **824***a* and/or the target zone in the tissue treatment region. As described herein, once the probe guide **1100** and the first electrode **824***a* are positioned relative to the tissue treatment region, the second electrode **824***b*, the third electrode **824***c*, and/or the fourth electrode **824***d* can be advanced though passages **1104***b*, **1104***c*, **1104***d*, respectively, of the probe guide **1100**. In various embodiments, the handle **1124** and/or contours **1120** can facilitate steadiness of the body portion **1102** of the probe guide **1100** as electrodes **824***b*, **824***c* and/or **824***d* are advanced through the passages **1104** of the body portion **1102**.

Referring now to FIGS. **28-34**, a probe guide **1200** can comprise a first body portion **1201** and a second body portion **1202**. In some embodiments, the probe guide **1200** can also comprise at least one spring element **1240** positioned between the first body portion **1201** and the second body portion **1202**, for example. The probe guide can comprise two spring elements **1240**, for example, and the spring elements **1240** can comprise coil springs, for example. In various embodiments, the spring elements **1240** can be movable from an initial configuration to at least one deformed configuration.

Referring primarily to FIG. **30**, the first body portion **1201** can comprise a plurality of first catches **1208**, **1210**. In various embodiments, the plurality of first catches **1208**, **1210** can extend from the first side and/or the second side of the first body portion **1201**. In some embodiments, at least one first side first catch **1208** can be positioned on a first side of the first body portion **1201**, for example, and at least one second side first catch **1210** can be positioned on a second side of the first body portion **1201**, for example. Referring still to FIG. **30**, the first body portion **1201** can comprise an inner surface **1220**. In some embodiments, when the first body portion **1201** is positioned relative to the second body portion **1202** (FIGS. **28** and **29**), the inner surface **1220** can be positioned adjacent to the second body portion **1202**. In some embodiments, the inner surface **1220** can be positioned adjacent to an inner surface **1222** on the second body portion **1202** (FIG. **31**). When the first body portion **1201** is positioned relative to the second body portion **1202**, the plurality of first catches **1208**, **1210** can extend from the inner surface **1220** of the first body portion **1201** towards the second body portion **1202**, for example. As described herein, the first catches **1208**, **1210** can each comprise a hooked extension (FIG. **29**). The first catches **1208**, **1210** and/or the hook(s) **1216** can form channels **1204***a*, **1204***b* (FIG. **29**) configured to restrain the electrodes **24***a*, **24***b* (FIG. **1**), as described herein. Referring again to FIG. **30**, the inner surface **1220** of the first body portion **1201** can also comprise an orifice **1238** and/or at least one opening or depression **1224**. As described herein, the orifice **1238** can be configured to receive the shaft of a screw **1230**, for example, and the depression **1224** can be configured to receive a spring element **1240**, for example.

Referring still to FIG. **30**, the plurality of first catches **1208**, **1210**, can comprise a plurality of first side first catches **1208** and/or a plurality of second side first catches **1210**, for example. The first side first catches **1208** can comprise an "A" first side first catch **1208***a*, a "B" first side first catch **1208***b*, and/or a "C" first side first catch **1208***c*, for example. In other embodiments, the plurality of first side first catches **1208** can comprise additional and/or fewer first side first catches **1208**. Furthermore, the first side first catches **1208***a*, **1208***b*, **1208***c* can be positioned along the first side of the first body portion **1201** and can be separated by a gap **1218** between each first side first catch **1208***a*, **1208***b*, **1208***c*. For example, a gap **1218** can be positioned between the "A" first side first catch **1208***a* and the "B" first side first catch **1208***b*, for example. Similarly, the second side of the first body portion **1201** can comprise a plurality of second side first catches **1210**. The plurality of second side first catches **1210** can comprise an "A" second side first catch **1210***a*, a "B" second side first catch **1210***b*, and/or a "C" second side first catch **1210***c*, for example. Similar to the description above, the plurality of second side first catches **1210** can comprise additional and/or fewer second side first catches **1210**, for example. Additionally, in various embodiments, gaps **1218** can be positioned between adjacent second side first catches **1210***a*, **1210***b*, **1210***c*. For example, a gap **1218** can be positioned between the "B" second side first catch **1210***b* and the "C" second side first catch **1210***c*.

Referring primarily to FIG. **31**, the second body portion **1202** can comprise a plurality of second catches **1212**, **1214**. In various embodiments, the plurality of second catches **1212**, **1214** can extend from the first side and/or the second side of the second body portion **1202**. In some embodiments, at least one first side second catch **1212** can be positioned on a first side of the second body portion **1202**, for example, and at least one second side second catch **1214** can be positioned on a second side of the second body portion **1202**, for example. Referring still to FIG. **31**, the second body portion **1202** can comprise an inner surface **1222**. In some embodiments, when the second body portion **1202** is positioned relative to the first body portion **1201** (FIGS. **28** and **29**), the inner surface **1222** can be positioned adjacent to the first body portion **1201**. In some embodiments, the inner surface **1222** can be positioned adjacent to the inner surface **1220** on the first body portion **1201** (FIG. **30**). When the second body portion **1202** is positioned relative to the first body portion **1201**, the plurality of second catches **1212**, **1214** can extend from the inner surface **1222** of the second body portion **1202** towards the first body portion **1201**, for example. As described herein, the second catches **1212**, **1214** can each comprise a hooked extension (FIG. **29**). The second catches **1212**, **1214** and/or the hook(s) **1216** can form channels **1204***a*, **1204***b* (FIG. **29**) configured to restrain electrodes **24***a*, **24***b* (FIG. **1**), as described herein. Referring primarily to FIG. **33**, the inner surface **1222** of the second body portion **1202** can also comprise an orifice **1239** and/or at least one depression or opening **1226**. As described herein, the orifice **1239** can be configured to receive the shaft of a screw **1230**, for example, and the depression **1226** can be configured to receive a spring element **1240**, for example.

Referring to FIG. **31**, the plurality of second catches **1212**, **1214**, can comprise a plurality of first side second catches **1212** and/or a plurality of second side second catches **1214**, for example. The first side second catches **1212** can comprise an "A" first side second catch **1212***a*, a "B" first side second catch **1212***b*, and/or a "C" first side second catch **1212***c*, for example. In other embodiments, the plurality of first side second catches **1212** can comprise additional and/or fewer first side second catches **1212**. Furthermore, the first side second catches **1208***a*, **1208***b*, **1208***c* can be positioned along the first side of the second body portion **1202** and can be separated by a gap **1218** between each first side second catch **1212***a*, **1212***b*, **1212***c*. For example, a gap **1218** can be positioned between the "A" first side second catch **1212***a* and the "B" first side second catch **1212***b*, for example. Similarly, the second side of the second body portion **1202** can comprise a plurality of second side second catches **1214**. The plurality of second side second catches **1214** can comprise an "A" second side second catch **1214***a*, a "B" second side second catch **1214***b*, and/or a "C" second side second catch **1214***c*, for example. Similar to the description above, the plurality of second side second catches **1214** can comprise additional and/or fewer second side first catches **1214**, for example. Additionally, in various embodiments, gaps **1218** can be positioned between adjacent second side second catches **1214***a*, **1214***b*, **1214***c*, for example. For example, a gap **1218** can be positioned between the "B" second side second catch **1214***b* and the "C" second side second catch **1214***c*.

Referring now to FIG. **32**, the fastener **1230** can comprise threads **1232** and/or a head **1234**, for example. In some embodiments, referring again to FIGS. **28** and **29**, the fastener **1230** can attach the first body portion **1201** to the second body portion **1202**. As described herein, the fastener **1230** can extend through an orifice **1238** in the first body portion **1201** and an orifice **1239** in the second body portion **1202**, for example. The inner surface **1220** of the first body portion **1201** and the inner surface **1222** of the second body portion **1202** can be defined by the amount the screw and/or screws **1230** are threadably engaged with the first and/or second body portions **1201**, **1202**. For example, the fastener(s) **1230** can be tightened such that the gap between the inner surface **1220** of the first body portion **1201** and the inner surface **1222** of the second body portion **1202** is reduced. In other embodiments, the fastener(s) **1230** can be loosened such that the gap between the inner surface **1220** of the first body portion **1201** and the inner surface **1222** of the second body portion **1202** is increased. In other embodiments, the first and second body portions **1201**, **1202** can be secured together by non-threaded fasteners.

Referring primarily to FIGS. **29** and **33**, the probe guide **1200** can comprise the spring element **1240**, which can be positioned in the depression **1226** in the inner surface **1224** of the second body portion **1202**. In various embodiments, the spring element **1240** can extend towards the first body portion **1201**, for example. When the fastener(s) **1230** secure the first body portion to the second body portion, the spring element or elements **1240** can be restrained therebetween. In various embodiments, the spring element(s) can be compressed between the first and second body portions **1201**, **1202**. The amount that the spring element(s) **1240** are compressed can depend on the fasteners **1230** and the gap between the first and second body portions **1201**, **1202**, for example. In at least one embodiment, the threaded fasteners **1240** can be tightened to reduce the gap between the body portions **1201**, **1202**, for example, and to compress the spring elements **1240** more, for example. The threaded fasteners **1240** can be loosened to increase the gap between the body portions **1201**, **1202**, for example, and to decompress the spring elements **1240**, for example. The clamping force on the electrodes can be changed by adjusting the spring. For example, a heavier gauge wire for the spring can be used to increase the forces on the spring element.

Referring primarily to FIG. **29**, in various embodiments, the plurality of first and second catches **1208**, **1210**, **1212**, and **1214** can form the first and second channels **1204***a*, **1204***b*. The first channel **1204***a* can be structured to restrain the first electrode **24***a* when the spring **1240** is in the initial configuration, for example, and the second channel **1204***b* can be structured to restrain the second electrode **24***b* when the spring **1240** is in the initial configuration, for example. In some embodiments, the first side first catches **1208***a*, **1208***b*, **1208***c* and the first side second catches **1212***a*, **1212***b*, **1212***c* can form the first channel **1204***a* that is configured to restrain the first electrode **24**A. Similarly, the second side first catches **1210***a*, **1210***b*, **1210***c* and the second side second catches **1214***a*, **1214***b*, **1214***c* can form the second channel **1204***b* that is configured to restrain the second electrode **24**B, for example. In such embodiments, the first channel **1204***a* can be positioned on the first side of the first body portion **1201**, for example, and the second channel **1204***b* can be positioned on the second side of the first body portion **1201**. Furthermore, as described herein, the distal end of the first electrode **24***a* can be spaced from the distal end of the second electrode **24***b* by a predetermined distance when the first electrode **24***a* is axially restrained in the first channel **104***a* and the second electrode **24***b* is axially restrained in the second channel **104***b*. The pre-determined distance can correspond to a treatment distance in the tissue treatment region. Furthermore, the distal ends of the first and second electrodes **24***a*, **24***b* can be operatively structured to conduct current therebetween when at least one of the first and second electrodes **24***a*, **24***b* is energized by an energy source **14** (FIG. **1**).

In various embodiments, the first electrode **24***a* can be positioned relative to the tissue treatment region. As described herein, pre-operative and intra-operative three-dimensional imaging can aid the operator in placing the first electrode **24***a* in the target treatment zone of the tissue treatment region, for example. In various embodiments, once the first electrode **24***a* is positioned relative to the tissue treatment region, the probe guide **1200** can be positioned around at least a portion of the first electrode **24***a*. In some embodiments, to position the probe guide **1200** around at least a portion of the first electrode **24***a*, the spring element **1240** can be deformed or compressed from an initial configuration to a deformed configuration such that the first channel **1204***a* defined by the plurality of first side first catches **1208** and the plurality of first side second catches **1212** opens to receive the first electrode **24***a*. The probe guide **1200** can be squeezed or compressed, for example, to open the channel **1204***a* to receive the first electrode **24***a*. In various embodiments, once the probe guide **1200** is in position relative to the first electrode **24***a*, e.g., the first electrode **24***a* is axially retained in the first channel **1204***a*, the second electrode **24***b* can be axially advanced through the second channel **1204***b* defined by the plurality of second side first catches **1210** and the plurality of second side second catches **1214**, for example. In other embodiments, to position the probe guide **1200** around at least a portion of the second electrode **24***b*, the spring element **1240** can be deformed or compressed from an initial configuration to a deformed configuration such that the second channel **1204***b* defined by the plurality of second side first catches **1210** and the plurality of second side second catches **1214** opens to receive the second electrode **24***b*. In various embodiments, an actuator (not shown) can compress the spring elements **1240** to open the first and/or second channels **1204***a*, **1204***b*, for example. Further, in some embodiments, the actuator can decompress the spring elements **1240** to close the first and/or second channels **1204***a*, **1204***b*, for example. In various embodiments, when the spring element **1240** is in the initial configuration, the probe guide **1200** can exert a clamping force on the electrode **24***a*, **24***b* restrained therein.

In various embodiments, referring to FIGS. **35** and **36**, a probe guide **1300** can comprise first and second body portions **1301**, **1302** similar to the first and second body portions **1201**, **1202** of probe guide **1200** described herein. Referring primarily to FIG. **35**, the second body portion **1302** can comprise an opening or depression **1326** in an inner surface **1322** that is configured to receive a spring element **1340**. In various embodiments, the spring element **1340** can comprise a leaf spring. Similar to other embodiments described herein, the spring element **1340** can be deformed from an initial configuration to a deformed configuration such that channel(s) defined by catches on the first and second body portions **1301**, **1302**, including first side second catches **1312***a*, **1312***b*, **1312***c*, for example, and second side second catches **1314***a*, **1314***b*, **1314***c*, for example, can open to receive the first and/or second electrodes **24***a*, **24***b* for example. Further, when the spring element **1340** returns to the initial configuration, the catches can close such that the channel(s) can axially restrain the first and/or second electrodes **24***a*, **24***b* for example.

In various embodiments, referring now to FIGS. **37-39**, a probe guide **1400** can comprise a first body portion **1401** and a second body portion **1402**, similar to first and second body portions **1201**, **1202** of probe guide **1200** described herein. In various embodiments, a spring element (not shown) can be positioned between the first body portion **14010** and the second body portion **1402**. The spring element can be a leaf spring, coil spring, or collapsible foam, for example. Similar to other embodiments described herein, the spring element can be movable from an initial configuration to deformed configurations. In various embodiments, referring primarily to FIG. **38**, the first body portion can comprise a substantially flat surface with a plurality of first side second catches **1412** and a plurality of second side second catches **1414** extending therefrom. Similar to other embodiments described herein, a gap **1418** can be positioned between adjacent catches **1412**, **1414**. Referring primarily to FIG. **39**, the plurality of first side second catches **1412** and the plurality of second side second catches **1414** can each comprise a hook or hooked extension **1416**. In various embodiments, the first side second catch **1412** can extend substantially away from the second body portion **1402**. However, in various embodiments, the hooked extension **1416** can extend back towards the second body portion **1402**. A contour **1417** can curve around a portion of the first side second catch **1412** and/or the second side second catch **1414**, for example. In various embodiments, when the first and second body portions **1401**, **1402** are positioned relative to each other to form a first and second channel to receive the electrodes **24***a*, **24***b*, the contours **1417** can be positioned adjacent to the electrodes **24***a*, **24***b*, for example.

Referring now to FIGS. **40-44**, a probe guide **1500** can comprise a first body portion **1501** and a second body portion **1502**. In various embodiments, a spring element (not shown) can be positioned between the first and second body portions **1501**, **1502**. In various embodiments, referring primarily to FIGS. **41-43**, the first body portion **1501** can comprise a substantially rectangular shape having a slot **1504** therethrough. In some embodiments, the slot **1504** can be rectangular or substantially rectangular. In other embodiments, the slot **1504** can be tapered, for example. Further, a flange **1508** can extend along a portion of the first body portion **1501** to a catch **1510**, for example. In some embodiments, the catch **1510** can be positioned at a distal end of the first body portion **1501**. In various embodiments, the catch **1510** can comprise at least one hook or hooked extension **1516** extending therefrom. Further, in at least one embodiment, the catch **1510** can comprise an angled projection **1518** extending towards the slot **1504**, for example.

Referring now to FIG. **44**, the second body portion **1502** can comprise a longitudinal extension **1520** and at least one leg **1522**. In some embodiments, the second body portion **1502** can comprise a first leg **1522** on a first side, for example, and a second leg **1522** on a second side, for example. Further, in at least one embodiment, an end of the second body portion can comprise a taper **1524**. In various embodiments, referring again to FIG. **40**, the first body portion **1501** can be positioned relative to the second body portion **1502** such that the longitudinal extension **1520** fits within the slot **1504**. Further, the legs **1522** of the second body portion **1502** can fit along the flange **1508** of the first body portion **1501** when the first body portion **1501** is positioned relative to the second body portion **1502**, for example. In such embodiments, the second body portion **1502** can fit within the substantially T-shaped cut-out in the first body portion **1501** between the slot **1504** and the catch **1510**. Further, the taper **1524** of the second body portion **1501** can be structured to receive the angled projection **1518** of the first body portion, for example.

In various embodiments, referring primarily to FIG. **40**, a spring (not shown) can be positioned between at least a portion of the first body portion **1501** and a portion of the second body portion **1502**. Similar to embodiments described herein, the first channel can be configured to receive the first electrode **24***a* and the second channel can be configured to receive the second electrode **24***b*. In various embodiments, when the spring is compressed, the channels can widen or open such that the first electrode **24***a* and/or the second electrode **24***b* can move into and/or out of their respective channels, for example. In such embodiments, the first electrode **24***a* can be positioned relative to the tissue treatment region in a patient. Subsequently, the probe guide **1500** can be positioned around at least a portion of the first electrode **24***a*, for example, by compressing the spring element and moving the second body portion **1502** relative to the first body portion **1501** such that the first channel opens to receive the first electrode **24***a*, for example. Subsequently, the second electrode **24***b* can be axially advanced through the second channel formed between the first body portion **1501** and the second body portion **1502**. When the spring returns or seeks to return to its pre-compressed configuration, the probe guide **1500** can exert a clamping force on the first and second electrodes **24***a*, **24***b* restrained therein.

Referring to FIGS. **45-47**, a probe guide **1600** can comprise a first body portion **1602***a* and a second body portion **1602***b*. In various embodiments, referring primarily to FIG. **47**, the first body portion **1602***a* can comprise a first end first catch **1608** and a second end first catch **1610**. The first end first catch **1608** can be positioned at or near a first distal end of the first body portion **1602***a*, for example, and the second end first catch **1610** can be positioned at or near a second distal end of the first body portion **1602***a*, for example. In various embodiments, the first end first catch **1608** and the second end first catch **1610** can each comprise an arcuate contour **1620** such that the first body portion **1602***a* turns or bends in a first direction at the first distal end and in a second direction at the second distal end. In some embodiments, the first direction can be an opposite or substantially opposite direction to the second direction. Further, in various embodiments, the second body portion **1602***b* can comprise a first end second catch **1612** and a second end second catch **1614**. The first end second catch **1612** can be positioned at or near a first distal end of the second body portion **1602***b*, for example, and the second end second catch **1614** can be positioned at or near a second distal end of the second body portion **1602***b*, for example. In various embodiments, the first end second catch **1612** and the second end second catch **1614** can each comprise an arcuate contour **1620** such that the second body portion **1602***b* bends in a first direction at the first distal end and in a second direction at the second distal end. In some embodiments, the first direction can be an opposite or substantially opposite direction to the second direction.

In various embodiments, the first and second body portions **1602***a*, **1602***b* can be symmetrical or substantially symmetrical. Further, the first and second body portions **1602***a*, **1602***b* can be positioned relative to each other such that the first catches **1608**, **1610** of the first body portion **1602***a* and the second catches **1612**, **1614** of the second body portion **1602***b* can form passages through the probe guide **1600**. For example, the second body portion **1602***b* can be positioned relative to the first body portion **1602***a* such that the first end first catch **1608** of the first body portion and the first end second catch **1612** of the second body portion **1602***b* form a first passage **1604***a*. Similarly, the second body portion **1602***b* can be positioned relative to the first body portion **1602***a* such that the second end first catch **1610** of the first body portion and the second end second catch **1614** of the second body portion **1602***b* form a second passage **1604***b*. Similar to embodiments described herein, the first passage **1604***a* can be structured to axially restrain the first electrode **24***a*, for example, and the second passage **1604***b* can be structured to axially restrain the second electrode **24***b*, for example.

In various embodiments, at least one of the first body portion **1602***a* and the second body portion **1602***b* can be pivotable. In various embodiments, the first body portion **1602***a* can pivot relative to the second body portion **1602***b*. In some embodiments, the first and second body portions **1602***a*, **1602***b* can be structured to pivot. The first body portion **1602***a* can pivot from an open guide position to a closed guide position, for example. In some embodiments, the first and second body portions **1602***a*, **1602***b* can pivot from the open guide position to the closed guide position. In various embodiments, when the first body portion **1602***a* is pivoted to the open guide position, a first outlet or opening (not shown) can open or expand. The first opening can extend from the first passage **1604***a* to an outer surface **1610** of the probe guide **1600**, for example. In various embodiments, the first opening can be structured to receive the first electrode **24***a* (FIG. **1**) when the first body portion **1602***a* is pivoted to the open position. Further, the first opening can permit movement of the first electrode **24***a* out of the first passage **1604***a*. In various embodiments, when the first body portion **1602***a* is pivoted to the closed position, the first opening can narrow or close such that the first opening cannot receive the first electrode **24***a* therethrough and the first electrode **24***a* cannot move in or out of the first passage **1604***a*.

In various embodiments, when the first body portion **1602***a* is pivoted to the open position, a second opening (not shown) can open or expand. The second opening can extend from the second passage **1604***b* to an outer surface **1610** of the probe guide **1600**. In various embodiments, the second opening can be structured to receive the second electrode **24***b* (FIG. **1**) when the first body portion **1602***a* is pivoted to the open position. Further, the second opening can permit movement of the second electrode **24***b* out of the second passage **1604***b*. In various embodiments, when the first body portion **1602***a* is pivoted to the closed position, the second opening can narrow or close such that the second opening cannot receive the second electrode **24***b* therethrough and the second electrode **24***b* cannot move in or out of the second passage **1604***b*.

In various embodiments, the probe guide **1600** can comprise an actuator (not shown). The actuator can pivot the first body portion between the open guide and closed guide positions. Further, in some embodiments, the actuator can be positioned in the hand piece **16** of the electrical ablation device **20** (FIG. **1**). In some embodiments, the probe guide **1600** can also comprise a shell (not shown) structured to hold the first body portion **1602***a* relative to the second body portion **1602***b*. Furthermore, the probe guide **1600** can comprise additional body portions. For example, the probe guide can comprise a third body portion **1602***c* and a fourth body portion **1602***d*. In various embodiments, at least one of the first, second, third, and fourth body portions **1602***a*, **1602***b*, **1602***c*, **1602***d* can be symmetrical with another body portion **1602***a*, **1602***b*, **1602***c*, **1602***d*, for example.

Similar to embodiments described herein, the distal end of the first electrode **24***a* (FIG. **1**) can be spaced from the distal end of the second electrode **24***b* (FIG. **1**) by a predetermined distance when the first electrode **24***a* is axially restrained in the first passage **1604***a* and the second electrode **24***b* is axially restrained in the second passage **1604***b*, for example. Further, the predetermined distance can correspond to a treatment distance in a tissue treatment region. In at least one embodiment, the distal ends of the first and second electrodes **24***a*, **24***b* can be operably structured to conduct current therebetween when at least one of the first and second electrodes **24***a*, **24***b* is energized by an energy source **14** (FIG. **1**), as described herein. During use, an operator can position the first electrode **24***a* relative to the tissue treatment region. As described herein, pre-operative and intra-operative three-dimensional imaging can aid the operator in placing the first electrode **24***a* in the target treatment zone of the tissue treatment region, for example. In various embodiments, the operator can puncture diseased tissue with the distal end of the first electrode **24***a*, for example, and insert at least a portion of the first electrode **24***a* therethrough. The distal end of the first electrode **24***a* can be inserted into the diseased tissue a predetermined depth, for example. Once the first electrode **24***a* is in place relative to the tissue treatment region, the operator may desire to position the second electrode **24***b* at a second position relative to the tissue treatment region such that a treatment distance is defined between the distal ends of the first and second electrodes **24***a*, **24***b*. A probe guide, such as probe guide **1600**, for example, can be selected. In various embodiments, the selected probe guide **1600** can comprise a predetermined distance between the first and second passages **1604***a*, **1604***b*, which can correspond with a preferred treatment distance. The operator may pivot at least one of the first body portion **1602***a* and second body portion such that the first opening opens the first passage **1604***a* to the outer surface **1610** of the probe guide **1600**. In at least one embodiment, the operator may engage an actuator to open or enlarge the first passage **1604***a* to the outer surface **1610**. Upon opening or enlarging the first passage **1604***a* to the outer surface **1610** of the probe guide **1600**, the first electrode **24***a* can pass through the first opening to the first passage **1604***a*. Once the first electrode **24***a* is positioned in the first passage **1604***a*, the operator can pivot at least one of the first body portion **1602***a* and the second body portion **1602***b* such that the first opening narrows or closes the first passage **1604***a* to the outer surface **1610** of the probe guide **1600**. The narrowed or closed first passage **1604***a* can axially restrain the first electrode **24***a* therein.

In various embodiments, the second passage **1604***b* can be defined through at least a portion of the probe guide **1600** when at least one of the first body portion **1602***a* and second body portion **1602***b* is pivoted to the closed position. In such embodiments, the second opening may be closed or narrowed such that the second electrode **24***b* can be axially restrained in the second passage **1604***b*. In various embodiments, when the first and/or second body portions **1602***a*, **1602***b* are pivoted to the closed position, the distal end of the second electrode **24***b* can be axially advanced through the second passage **1604***b* to the tissue treatment region. As the distal end of the second electrode **24***b* is advanced through the second passage **1604***b*, the second passage **1604***b* can guide the second electrode **24***b* a predetermined distance from the distal end of the first electrode **24***a*, for example, and/or along a path parallel or substantially parallel to the first electrode **24***a*, for example.

Referring to FIGS. **48-51**, a probe guide **1700** can comprise a body **1702**. In various embodiments, the body **1702** can comprise a resilient and/or elastomeric material such that the body **1702** seeks to return to an initial configuration when the body **1702** is deformed from the initial configuration to a deformed configuration. The body **1702** can comprise Pellethane® TPE, Santoprene™ thermoplastic vulcanizate (TPV), and/or silicone, for example. In various embodiments, the body **1702** can comprise silicone, for example, having a durometer Shore A hardness of 40-90. In at least one embodiment, referring primarily to FIG. **51**, the probe guide **1700** can comprise a bore **1714** at least partially therethrough. The bore can extend from a top or proximal surface **1706** to a bottom or distal surface **1708**, for example. In various embodiments, the bore **1714** can define an inner surface **1720** through the body **1702**. In some embodiments, the inner surface **1720** of the bore **1714** can be deformable from an initial configuration to at least one deformed configuration. In various embodiments, the probe guide **1700** can also comprise a first passage **1704***a* through the body **1702** and/or a second passage **1704***b* though the body **1702**. The first passage **1704***a* can be positioned on a first side of the bore **1714**, for example, and the second passage **1704***b* can be positioned on a second side of the bore **1714**, for example. In at least one embodiment, the first passage **1704***a* can be structured to axially restrain the first electrode **24***a* when the body **1702** and/or the inner surface **1720** of the bore **1714** is in the initial configuration (FIG. **49**). Further, in at least one embodiment, the second passage **1704***b* can be structured to axially restrain the second electrode **24***b* when the body **1702** and/or the inner surface **1720** of the bore is in the initial configuration (FIG. **49**). In various embodiments, the first electrode **24***a* can be releasable from the first passage **1704***a* when the body **1702** and/or the inner surface **1720** of the bore **1714** is moved from the initial configuration to a deformed configuration (FIG. **50**). Further, in various embodiments, the second electrode **24***b* can be releasable from the second passage **1704***b* when the body **1702** and/or the inner surface **1720** of the bore **1714** is moved from the initial configuration to a deformed configuration (FIG. **50**). As described herein, the first and second electrodes **24***a*, **24***b* can be released from the first and second passages **1704***a*, **1704***b* through outlets **1712***a*, **1712***b*, respectively.

In various embodiments, the bore **1714** can comprise a maximum diameter or width across the bore **1714**. In some embodiments, the bore **1714** can comprise a substantially cubic, rhombic, or rectangular cross-sectional geometry when the body **1702** is in the initial, undeformed configuration. In other embodiments, the cross-sectional geometry of the bore **1714** can comprise a circular, elliptical, or polygonal shape. When the body **1702** and/or the inner surface **1720** of the bore **1714** is moved to a deformed configuration, the maximum width of the bore **1714** can be reduced, the maximum length across the bore **1714** can be increased, and/or the cross-sectional geometry of the bore **1714** can be altered. In various embodiments, the maximum width across the bore **1714** can be reduced, the maximum length across the bore can be increased, and the cross-sectional geometry of the bore **1714** can be changed from a substantially rhombic geometry to a substantially elongated oval geometry.

In various embodiments, the body **1702** can also comprise at least one outlet or slot **1712***a*, **1712***b*. In at least one embodiment, a first outlet **1712***a* can extend from the outer surface **1710** of the body **1702** to at least the first passage **1704***a*, for example, and a second outlet **1712***b* can extend from the outer surface **1710** to at least the second passage **1704***b*, for example. The first outlet **1712***a* can extend from a first side of the body **1702** towards the bore **1714**, for example, and the second outlet **1712***b* can extend from a second side of the body towards the bore **1714**, for example. In various embodiments, the geometry of the outlets **1712***a*, **1712***b* can be altered when the body **1702** and/or the inner surface **1720** of the bore **1714** is moved from an initial configuration to a deformed configuration. The outlets **1712***a*, **1712***b* can comprise an outward flare, for example, when the body **1702** and/or the inner surface of the bore **1714** is moved to a deformed configuration (FIG. **50**). As described herein, altering the geometry of the outlets **1712***a*, **1712***b* can permit the release of the first and/or second electrodes **24***a*, **24***b* from the first and/or second passages **1704***a*, **1704***b*, respectively.

In various embodiments, the first outlet **1712***a* can comprise a first minimum diameter when the body **1702** and/or the inner surface **1720** of the bore **1714** is in an initial configuration and the first outlet **1712***a* can comprise a second minimum diameter when the body **1702** and/or the inner surface **1720** of the bore **1714** is in a deformed configuration. In at least one embodiment, the first minimum diameter can be less than the second minimum diameter. Further, in various embodiments, the first minimum diameter can be less than the diameter of the first electrode **24***a*, for example, and the second minimum diameter can be greater than the diameter of the first electrode **24***a*, for example. In such embodiments, the first electrode **24***a* can move through the first outlet **1712***a* when the body **1702** and/or the inner surface **1720** of the bore **1714** is in a deformed configuration, for example. Further, the first electrode **24***a* can be restrained in the first passage **1704***a* when the body **1702** and/or the inner surface **1720** of the bore **1714** is in the initial configuration, i.e., the first electrode **24***a* cannot move or fit through the first outlet **1712***a*, for example. In some embodiments, the first minimum diameter of the first outlet **1712***a* can substantially match the diameter of the first electrode **24***a* and, in various embodiments, the first outlet **1712***a* can apply a clamping force to the first electrode **24***a* to hold the first electrode **24***a* in position when the body **1702** and/or the inner surface **1720** of the bore **1714** is in the initial configuration.

Similarly, in various embodiments, the second outlet **1712***b* can comprise a first minimum diameter when the body **1702** and/or the inner surface **1720** of the bore **1714** is in an initial configuration and the second outlet **1712***b* can comprise a second minimum diameter when the body **1702** and/or the inner surface **1720** of the bore **1714** is in a deformed configuration. In at least one embodiment, the first minimum diameter can be less than the second minimum diameter. Further, in various embodiments, the first minimum diameter can be less than the diameter of the second electrode **24***b*, for example, and the second minimum diameter can be greater than the diameter of the second electrode **24***b*, for example. In such embodiments, the second electrode **24***b* can move through the second outlet **1712***b* when the body **1702** and/or the inner surface **1720** of the bore **1714** is in a deformed configuration, for example. Further, the second electrode **24***b* can be restrained in the second passage **1704***b* when the body **1702** and/or the inner surface **1720** of the bore **1714** is in the initial configuration, i.e., the second electrode **24***b* cannot move or fit through the second outlet **1712***b*, for example. In some embodiments, the first minimum diameter of the second outlet **1712***b* can substantially match the diameter of the second electrode **24***b* and, in various embodiments, the second outlet **1712***b* can apply a clamping force to the second electrode **24***b* to hold the second electrode **24***b* in position when the body **1702** and/or the inner surface **1720** of the bore **1714** is in the initial configuration.

Similar to embodiments described herein, the distal end of the first electrode **24***a* can be spaced from a distal end of the second electrode **24***b* by a predetermined distance when the first electrode **24***a* is axially restrained in the first passage **1704***a* and the second electrode **24***b* is axially restrained in the second passage **1704***b*, for example. Further, the predetermined distance can correspond to a treatment distance in a tissue treatment region. In at least one embodiment, the distal ends of the first and second electrodes **24***a*, **24***b* can be operably structured to conduct current therebetween when at least one of the first and second electrodes **24***a*, **24***b* is energized by an energy source **14** (FIG. **1**), as described herein. During use, an operator can position the first electrode **24***a* relative to the tissue treatment region. As described herein, pre-operative and intra-operative three-dimensional imaging can aid the operator in placing the first electrode **24***a* in the target treatment zone of the tissue treatment region, for example. Once the first electrode **24***a* is in place relative to the tissue treatment region, the operator may desire to position the second electrode **24***b* at a second position relative to the tissue treatment region such that a treatment distance is defined between the distal ends of the first and second electrodes **24***a*, **24***b*, for example. A probe guide, such as probe guide **1700**, for example, can be selected by the operator. In various embodiments, the selected probe guide **1700** can comprise a predetermined distance between the first and second passages **1704***a*, **1704***b*, which can correspond with a preferred treatment distance between electrodes **24***a*, **24***b*. The operator may deform the body **1702** and/or the inner surface **1720** of the bore **1714** from the initial configuration to a deformed configuration such that the geometry of the first outlet **1712***a* changes to accommodate the first electrode **24***a* therethrough (FIG. **50**). Upon deforming the probe guide **1700**, the first electrode **24***a* can pass through the first outlet **1712***a* to the first passage **1704***a*. Once the first electrode **24***a* is positioned in the first passage **1704***a*, the operator can release the body **1702** of the probe guide **1700**. In at least one embodiment, the body **1702** can seek to return to the initial, undeformed configuration when released by the operator, for example (FIG. **49**). Further, the probe guide **1700** can substantially return to the initial, undeformed configuration such that the first and second passages **1704***a*, **1704***b* are structured to axially restrain the first and second electrodes **24***a*, **24***b*, respectively.

In various embodiments, the second passage **1704***b* can be defined through at least a portion of the probe guide **1700** when the body **1702** and/or the inner surface **1720** of the bore **1714** returns or substantially returns to the initial, undeformed configuration (FIG. **49**). In such embodiments, the second outlet **1712***b* may be closed or narrowed such that the second electrode **24***b* can be axially restrained in the second passage **1704***b*, i.e., the second electrode **24***b* cannot move through the second outlet **1712***b* out of the second passage **1704***b*. In various embodiments, when the body **1702** has substantially returned in the initial configuration, the distal end of the second electrode **24***b* can be axially advanced through the second passage **1704***b* to the tissue treatment region. As the distal end of the second electrode **24***b* is advanced through the second passage **1704***b*, the second passage **1704***b* can guide the second electrode **24***b* a predetermined distance from the distal end of the first electrode **24***a*, for example, and/or along a path parallel or substantially parallel to the first electrode **24***a*, for example.

Referring primarily to FIG. **52**, the probe guide **1700** can be manufactured by a molding technique, for example. In various embodiments, a frame **1750** can comprise a top **1752** and a bottom **1754**. In some embodiments, a mold **1760** can comprise an upper portion **1762**, a lower portion **1764**, a first side portion **1766**, a second side portion **1768** and/or a central portion **1770**, for example. In at least one embodiment, the lower portion **1764** of the mold **1760** can be removably positioned in the bottom **1754** of the frame **1750**, for example, and/or the upper portion **1762** of the mold **1760** can be removably positioned in the top **1752** of the frame **1750**, for example. The upper portion **1762** of the mold **1760** can comprise a surface that corresponds to the outer surface **1710** of the body **1702** of the probe guide **1700**, for example. Further, the lower portion **1764** of the mold **1760** can comprise a surface that corresponds to the outer surface **1710** of the body **1702** of the probe guide **1700**, for example. In at least one embodiment, at least a portion of the second side portion **1766** can comprise a geometry that corresponds to the geometry of the second outlet **1712***b* and/or the second passage **1704***b*, for example. Further, at least a portion of the first side portion **1768** can comprise a geometry that at least substantially corresponds to the geometry of the first outlet **1712***a* and/or the first passage **1704***a*, for example.

In various embodiments, the upper portion **1762**, the lower portion **1764**, the first side portion **1766**, and the second side portion **1768** can be positioned between the top **1752** and the bottom **1754** of the frame **1750**. Further, the central portion **1770** can be positioned between the upper portion **1762**, the lower portion **1764**, the first side portion **1766** and the second side portion **1768**. The central portion **1770** can be held or retained in place by a pin or bracket in an end wall (not shown) of the frame **1750**, for example. In at least one embodiment, once the mold **1760** is positioned in the frame **1750**, the material forming the body **1702** of the probe guide **1700** can be added to the frame **1750**. The body material **1702** can be fluidic when added to the frame **1750**. In various embodiments, the body material can be poured into the frame **1750** and can flow around the first and second side portions **1766**, **1768** and the central portion **1770**, for example. In various embodiments, after the body material cures, or at least sufficiently cures, the body **1702** of the probe guide **1700** can be removed from the frame **1750**.

Referring to FIGS. **53** and **54**, a probe guide **1800** can comprise a body **1802**. In various embodiments, the body **1802** can comprise a resilient and/or elastomeric material such that the body **1802** seeks to return to an initial configuration when the body is deformed from the initial configuration to a deformed configuration. The body **1802** can comprise Pellethane® TPE, Santoprene™ thermoplastic vulcanizate (TPV), and/or silicone, for example. In various embodiments, the body **1702** can comprise silicone, for example, having a durometer Shore A hardness of 40-90. In at least one embodiment, the probe guide **1800** can comprise a bore **1814** at least partially therethrough. The bore **1814** can extend from a top or proximal surface **1806** to a bottom or distal surface (not shown), for example. In various embodiments, the bore **1814** can define an inner surface **1820** through the body **1802**. In some embodiments, the inner surface **1820** of the bore **1814** can be deformable from an initial configuration to at least one deformed configuration. In various embodiments, the probe guide **1800** can also comprise a first passage **1804***a* through the body **1802** and/or a second passage **1804***b* though the body **1802**. The first passage **1804***a* can be positioned on a first side of the bore **1814**, for example, and the second passage **1804***b* can be positioned on a second side of the bore **1814**, for example. In at least one embodiment, the first passage **1804***a* can be structured to axially restrain the first electrode **24***a* (FIG. **1**) when the body **1802** and/or the inner surface **1820** of the bore **1814** is in the initial configuration (FIG. **53**). Further, in at least one embodiment, the second passage **1804***b* can be structured to axially restrain the second electrode **24***b* (FIG. **1**) when the body **1802** and/or the inner surface **1820** of the bore **1814** is in the initial configuration (FIG. **53**). In various embodiments, the first electrode **24***a* can be releasable from the first passage **1804***a* when the body **1802** and/or the inner surface **1820** of the bore **1814** is moved from the initial configuration to a deformed configuration (FIG. **54**). Further, in various embodiments, the second electrode **24***b* can be releasable from the second passage **1804***b* when the body **1802** and/or the inner surface **1820** of the bore **1814** is moved from the initial configuration to a deformed configuration (FIG. **54**). As described herein, the first and second electrodes **24***a*, **24***b* can be released from the first and second passages **1804***a*, **1804***b* through outlets **1812***a*, **1812***b*, respectively. Deformation of the body **1802** and/or the inner surface **1820** of the bore **1814** can open the first passage **1804***a*, the second passage **1804***b* or both passages **1804***a*, **1804***b*, for example, to permit the release of the first electrode **24***a*, the second electrode **24***b* and/or both electrodes **24***a*, **24***b*, respectively.

In various embodiments, the inner surface **1820** of the bore **1814** can comprise a first edge **1815** and a second edge **1816**. The first edge **1815** can be angularly offset from the second edge **1816** when the inner surface **1820** is in the initial configuration, for example. Further, the first edge **1815** can substantial abut or be substantially flush with the second edge **1816** when the inner surface **1820** is in a first deformed configuration, for example. Similarly, in various embodiments, the inner surface **1820** of the bore **1814** can comprise a third edge **1822** and a fourth edge **1824**. The third edge **1822** can be angularly offset from the fourth edge **1824** when the inner surface in the initial configuration, for example. Further, the third edge **1822** can substantially abut or be substantially flush with the fourth edge **1824** when the inner surface **1820** is in a second deformed configuration. In various embodiments, the first deformed configuration can match or substantially match the second deformed configuration. In such embodiments, the first edge **1815** can be angularly offset from the second edge **1816** when the third edge **1822** is angularly offset from the fourth edge **1824**, for example. Furthermore, in such embodiments, the first edge **1815** can substantially abut the second edge **1816** when the third edge **1822** substantially abuts the fourth edge **1824**, for example. In various other embodiments, the first deformed configuration may not match the second deformed configuration. In such embodiments, the first edge **1815** can substantially abut the second edge **1816** even when the third edge **1822** does not substantially abut the fourth edge **1824**, for example. In various embodiments, for example, the inner surface **1820** or the bore **1814** can be deformed such that the first edge **1815** substantially abuts the second edge **1816**, however, despite such deformation of the inner surface **1820**, the third and fourth edges **1822**, **1824** can remain angularly offset, and thus, the initial minimum diameter of the second outlet **1812***b* can restrain the second electrode **24***b* (FIG. **1**) such that the second electrode **24***b* is held in the second passage **1804***b* while the first electrode **24***a* can move through the first outlet **1812***a*. Furthermore, in various embodiments, when the first and second edges **1815**, **1816** substantially abut and the third and fourth edges **1822**, **824** remain angularly offset, the distance between the passages **1804***a*, **1804***b* can remain substantially the same.

Referring still to FIGS. **53** and **55**, the body **1802** of the probe guide **1800** can comprise a plurality of body portions. The probe guide **1800** can comprise first, second, third and fourth body portions **1802***a*, **1802***b*, **1802***c*, **1802***d*, for example. In various embodiments, flanges **1830** can extend between at least two adjacent body portions. A flange **1830** can extend between the second and the third body portions **1802***b*, **1802***c*, for example, and another flange **1830** can extend between the fourth and the first body portions **1802***d*, **1802***a*, for example. In various embodiments, at least one of the flanges **1830** and/or the body portions **1802** comprises a resilient and/or elastomeric material. In various embodiments, at least two adjacent body portions can be attached at a flexible joint **1832**. For example, the first and second body portions **1802***a*, **1802***b* can be attached at a flexible joint **1832** and the third and fourth body portions **1802***c*, **1802***d* can be attached at a flexible joint **1832**, for example. In various embodiments, the flexible joints **1832** can permit the attached body portions to hinge relative to each other.

Referring primarily to FIG. **53**, in at least one embodiment, the first passage **1804***a* and/or the first outlet **1812***a* can be formed between the first and second body portions **1802***a*, **1802***b*. The first outlet **1812***a* can comprise an initial minimum diameter D_a when the inner surface **1820** of the bore **1814** is in the initial configuration, for example. In at least one embodiment, the initial minimum diameter D_a of the first outlet **1812***a* can restrain the first electrode **24***a* (FIG. **1**) such that the first electrode **24***a* is held in the first passage **1804***a*. Referring now to FIG. **54**, when the inner surface **1820** of the bore **1814** is moved to a first deformed configuration, the first outlet **1812***a* can comprise a deformed minimum diameter D_a', for example. The deformed minimum diameter D_a' be larger than the initial minimum diameter D_a such that the first outlet **1812***a* can permit movement of the first electrode **24***a* in or out of the first passage **1804***a*, for example.

Additionally or alternatively, the second passage **1804***c* and/or the second outlet **1812***b* can be formed between the third and fourth body portions **1802***c*, **1802***d*. The second outlet **1812***a* can comprise an initial minimum diameter when the inner surface **1820** of the bore **1814** is in the initial configuration, for example. In at least one embodiment, the initial minimum diameter of the second outlet **1812***b* can restrain the second electrode **24***b* such that the second electrode **24***b* is held in the second passage **1804***b*. When the inner surface **1820** is moved to a second deformed configuration, the second outlet **1812***b* can comprise a deformed minimum diameter, which can be larger than the initial minimum diameter such that the second outlet **1812***b* can permit movement of the second electrode **24***b* in or out of the second passage **1804***b*, for example.

Similar to embodiments described herein, the distal end of the first electrode **24***a* (FIG. **1**) can be spaced from a distal end of the second electrode **24***b* (FIG. **1**) by a predetermined distance when the first electrode **24***a* is axially restrained in the first passage **1804***a* and the second electrode **24***b* is axially restrained in the second passage **1804***b*, for example. Further, the predetermined distance can correspond to a treatment distance in a tissue treatment region. In at least one embodiment, the distal ends of the first and second electrodes **24***a*, **24***b* can be operably structured to conduct current therebetween when at least one of the first and second electrodes **24***a*, **24***b* is energized by an energy source **14** (FIG. **1**), as described herein. During use, an operator can position the first electrode **24***a* relative to the tissue treatment region. As described herein, pre-operative and intra-operative three-dimensional imaging can aid the operator in placing the first electrode **24***a* in the target treatment zone of the tissue treatment region, for example. Once the first electrode **24***a* is in place relative to the tissue treatment region, the operator may desire to position the second electrode **24***b* at a second position relative to the tissue treatment region such that a treatment distance is defined between the distal ends of the first and second electrodes **24***a*, **24***b*, for example. A probe guide, such as probe guide **1800**, for example, can be selected by the operator. In various embodiments, the selected probe guide **1800** can comprise a predetermined distance between the first and second passages **1804***a*, **1804***b*, which can correspond with a preferred treatment distance between electrodes **24***a*, **24***b*. The operator may deform the body **1802** and/or the inner surface **1820** of the bore **1814** from the initial configuration (FIG. **53**) to a deformed configuration (FIG. **54**) wherein the geometry of the first outlet **1812***a* changes to accommodate the first electrode **24***a* therethrough. Upon deforming the probe guide **1800**, the first electrode **24***a* can pass through the first outlet **1812***a* to the first passage **1804***a*. Once the first electrode **24***a* is positioned in the first passage **1804***a*, the operator can release the body **1802** of the probe guide **1800**. In various embodiments, the body **1802** can seek to return to the initial, undeformed configuration (FIG. **53**) when released by the operator, for example. Further, the probe guide **1800** can return or substantially return to the initial, undeformed configuration such that the first and second passages **1804***a*, **1804***b* are structured to axially restrain the first and second electrodes **24***a*, **24***b*, respectively.

In various embodiments, the second passage **1804***b* can be defined through at least a portion of the probe guide **1800** when the body **1802** and/or the inner surface **1820** of the bore **1814** returns or substantially returns to the initial, undeformed configuration (FIG. **53**). In such embodiments, the second outlet **1812***b* may be closed or narrowed such that the second electrode **24***b* can be axially restrained in the second passage **1804***b*, i.e., the second electrode **24***b* cannot move through the second outlet **1812***b* in or out of the second passage **1804***b*. In various embodiments, when the body **1802** has returned or substantially returned in the initial configuration, the distal end of the second electrode **24***b* can be axially advanced through the second passage **1804***b* to the tissue treatment region. As the distal end of the second electrode **24***b* is advanced through the second passage **1804***b*, the second passage **1804***b* can guide the second electrode **24***b* a predetermined distance from the distal end of the first electrode **24***a*, for example, and/or along a path substantially parallel to the first electrode **24***a*, for example. In other embodiments, the body **1802** and/or the inner surface **1820** of the bore **1814** can be deformed such that the second outlet **1812***b* opens or enlarges to permit lateral movement of the second electrode **24***b* therethrough to the second passage **1804***b*. Subsequently, the body **1802** can be released and the body **1802** can return or substantially return to the initial, undeformed configuration (FIG. **53**), wherein the first and second electrodes **24***a*, **24***b* are axially restrained in the first and second passages **1804***a*, **1804***b*, respectively.

Referring to FIG. **55**, a probe guide **1900** can comprise a body **1902**. In various embodiments, the body **1902** can comprise a resilient and/or elastomeric material such that the body **1902** seeks to return to an initial configuration when the body is deformed from the initial configuration to a deformed configuration. The body **1902** can comprise Pellethane® TPE, Santoprene™ thermoplastic vulcanizate (TPV), and/or silicone, for example. In various embodiments, the body **1702** can comprise silicone, for example, having a durometer Shore A hardness of 40-90. In at least one embodiment, the probe guide **1900** can comprise a bore **1914** at least partially extending through the body **1902**. The bore **1914** can extend from a top or proximal surface **1906** to a bottom or distal surface (not shown), for example. In various embodiments, the bore **1914** can define an inner surface **1920** through the body **1902**. In some embodiments, the inner surface **1920** of the bore **1914** can be deformable from an initial configuration to at least one deformed configuration. In various embodiments, the probe guide **1900** can also comprise a first passage **1904***a* through the body **1902** and/or a second passage **1904***b* though the body **1902**. The first passage **1904***a* can be positioned on a first side of the bore **1914**, for example, and the second passage **1904***b* can be positioned on a second side of the bore **1914**, for example. In at least one embodiment, the first passage **1904***a* can be structured to axially restrain the first electrode **24***a* when the body **1902** and/or the inner surface **1920** of the bore **1914** is in the initial configuration (FIG. **55**). Further, in at least one embodiment, the second passage **1904***b* can be structured to axially restrain the second electrode **24***b* when the body **1902** and/or the inner surface **1920** of the bore is in the initial configuration. In various embodiments, the first electrode **24***a* can be releasable from the first passage **1904***a* when the body **1902** and/or the inner surface **1920** of the bore **1914** is moved from the initial configuration to a deformed configuration (not shown). Further, in various embodiments, the second electrode **24***b* can be releasable from the second passage **1904***b* when the body **1902** and/or the inner surface **1920** of the bore **1914** is moved from the initial configuration to a deformed configuration. As described herein, the first and second electrodes **24***a*, **24***b* can be released from the first and second passages **1904***a*, **1904***b* through outlets (not shown).

In various embodiments, the body **1902** of the probe guide **1900** can comprise a first body portion **1902***a* and a second body portion **1902***b*. In at least one embodiment, the first body portion **1902***a* can comprise an upper portion of the probe guide **1900**, for example, and the second body portion **1902***b* can comprise a lower portion of the probe guide **1900**, for example. Further, in various embodiments, at least one passage **1904***a*, **1904***b* can be positioned between and/or adjacent to the first and second body portions **1902***b*. For example, the first passage **1904***a* can be positioned between the first and second body portions **1902***a*, **1902***b* on a first side of the bore **1914** and the second passage **1904***b* can be positioned between the first and second body portions **1902***a*, **1902***b* on a second side of the bore **1914**.

In at least one embodiment, the probe guide **1900** can also comprise a beam **1930**. The beam **1903** can laterally traverse the bore **1914** from the first side to the second side of the probe guide **1900**, for example. In various embodiments, the beam **1930** can comprise a substantially rigid or inflexible material such as polystyrene or a thermoplastic polymer, for example, polyethylene or polycarbonate, such as, for example, Lexan®, Makrolon®, Makroclear®. The beam **1930** can comprise a first end **1932** and a second end **1934**, for example. In some embodiments, the first end **1932** can be positioned adjacent to the first passage **1904***a*, for example, and the second end **1934** can be positioned adjacent to the second passage **1904***b*, for example. In at least one embodiment, the first end **1932** can comprise a first groove **1936** and/or the second end **1934** can comprise a second groove **1938**. The grooves **1936**, **1938** can comprise an arcuate contour and/or semi-circle, for example. In various embodiments, the first groove **1936** can form a portion of the first passage **1904***a* and the second groove **1938** can for a portion of the second passage **1904***b*.

Referring still to FIG. **55**, the beam **1930** can resist deformation when the inner surface **1920** of the bore **1914** is moved from an initial configuration to a deformed configuration. In at least one embodiment, when at least one of the body portions **1902***a*, **1902***b* and the inner surface **1920** of the probe guide **1900** is moved to a deformed configuration, the first and/or second passages **1904***a*, **1904***b* can open such that an electrode **24***a*, **24***b* can move into and/or out of the passages **1904***a*, **1904***b*, for example. In various embodiments, the first body portion **1902***a* can move away from the second body portion **1902** at the first passage **1904***a*, the second passage **1904***b* or both passages **1904***a*, **1904***b* to open the passage(s) **1904***a*, **1904***b* to an outer surface **1926** of the probe guide **1900**. As the body portions **1902***a*, **1902***b* and/or the inner surface **1920** of the bore **1914** are deformed, the beam **1940** can resist deformation and remain stationary in the bore **1914**, for example. In various embodiments, edges and or corners on the first and/or second body portions **1902***a*, **1902***b* can be structured to hold the beam **1930** relative to the body portions **1902***a*, **1902***b* and/or the passages **1904***a*, **1904***b*, for example. In other embodiments, fasteners and/or adhesive may secure the beam **1930** relative to the body portions **1902***a*, **1902***b* and/or the passages **1904***a*, **1904***b*, for example.

Similar to embodiments described herein, the distal end of the first electrode **24***a* (FIG. **1**) can be spaced from a distal end of the second electrode **24***b* (FIG. **1**) by a predetermined distance when the first electrode **24***a* is axially restrained in the first passage **1904***a*, for example, and the second electrode **24***b* is axially restrained in the second passage **1904***b*, for example. Further, the predetermined distance can correspond to a treatment distance in a tissue treatment region. In at least one embodiment, the distal ends of the first and second electrodes **24***a*, **24***b* can be operably structured to conduct current therebetween when at least one of the first and second electrodes **24***a*, **24***b* is energized by an energy source **14** (FIG. **1**), as described herein. During use, an operator can position the first electrode **24***a* relative to the tissue treatment region. As described herein, pre-operative and intra-operative three-dimensional imaging can aid the operator in placing the first electrode **24***a* in the target treatment zone of the tissue treatment region, for example. Once the first electrode **24***a* is in place relative to the tissue treatment region, the operator may desire to position the second electrode **24***b* at a second position relative to the tissue treatment region such that a treatment distance is defined between the distal ends of the first and second electrodes **24***a*, **24***b*, for example. A probe guide, such as probe guide **1900**, for example, can be selected by the operator. In various embodiments, the selected probe guide **1900** can comprise a predetermined distance between the first and second passages **1904***a*, **1904***b*, which can correspond with a preferred treatment distance between electrodes **24***a*, **24***b*. The operator may deform the body **1902** and/or the inner surface **1920** of the bore **1914** from the initial configuration to a deformed configuration such that an electrode **24***a*, **24***b* can pass into at least one of the first and second passages **1904***a*, **1904***b*. Upon deforming the probe guide **1900**, the first electrode **24***a* can pass into the first passage **1904***a*, for example. Once the first electrode **24***a* is positioned in the first passage **1904***a*, the operator can release the body **1902** of the probe guide **1900**. In at least one embodiment, the body **1902** can seek to return to the initial, undeformed configuration when released by the operator. Further, the probe guide **1900** can substantially return to the initial, undeformed configuration such that the first and second passages **1904***a*, **1904***b* are structured to axially restrain the first and second electrodes **24***a*, **24***b*, respectively.

In various embodiments, the second passage **1904***b* can be defined through at least a portion of the probe guide **1900** when the body **1902** and/or the inner surface **1920** of the bore **1914** returns or substantially returns to the initial, undeformed configuration (FIG. **55**). In such embodiments, the second passage **1904***b* may be closed or narrowed such that the second electrode **24***b* can be axially restrained therein, i.e., the second electrode **24***b* cannot move laterally into or out of the second passage **1904***b*. In various embodiments, when the body **1902** has substantially returned to the initial configuration, the distal end of the second electrode **24***b* can be axially advanced through the second passage **1904***b* to the tissue treatment region. As the distal end of the second electrode **24***b* is advanced through the second passage **1904***b*, the second passage **1904***b* can guide the second electrode **24***b* a predetermined distance from the distal end of the first electrode **24***a*, for example, and/or along a path substantially parallel to the first electrode **24***a*, for example.

What is claimed is:

1. A laparoscopic system comprising:

an electrical ablation device comprising a first electrode and a second electrode;

an energy source electrically coupled to the first and second electrodes; and

an electrode guide for guiding the first and second electrodes relative to a tissue treatment region, wherein the electrode guide is dimensioned and shaped for placement internal to a patient body and is positionable within the patient body between the electrical ablation device and the tissue treatment region, and wherein the electrode guide comprises a body comprising:

a proximal surface;

a tissue-abutment surface configured to abut tissue in the tissue treatment region;

a first passage through the body from the proximal surface to the tissue-abutment surface, wherein the first passage is configured to receive the first electrode protruding from the electrical ablation device, and wherein the first passage is configured to axially restrain the first electrode when the electrode guide is positioned against the tissue; and

a second passage through the body from the proximal surface to the tissue-abutment surface, wherein the second passage is substantially parallel to the first passage, wherein the second passage is configured to receive the second electrode protruding from the electrical ablation device, and wherein the second passage is configured to axially restrain the second electrode when the electrode guide is positioned against the tissue;

wherein the first passage is spaced a predetermined distance from the second passage, and wherein the predetermined distance corresponds to a treatment distance in the tissue treatment region;

wherein the body comprises an elastomeric material, and wherein at least a portion of the body is moveable between a first configuration and a second configuration, wherein the body comprises an outer surface, and wherein the first passage comprises an outlet that operably closes the first passage to the outer surface when the body is in the first configuration.

2. The laparoscopic system of claim **1**, wherein the energy source comprises a Radio Frequency (RF) energy source.

3. The laparoscopic system of claim **1**, wherein the energy source comprises a pulsed energy source.

4. The laparoscopic system of claim **1**, wherein the energy source comprises an irreversible electroporation energy source.

5. The laparoscopic system of claim **4**, wherein the energy source comprises a pulsed energy source.

6. The laparoscopic system of claim **1**, wherein a current supplied by the energy source is selected to generate an electric field of approximately 1500 Volts per centimeter.

7. A device for laparoscopic procedures, comprising:

an electrode guide for guiding electrodes relative to a tissue treatment region, wherein the electrode guide is dimensioned and shaped for placement internal to a patient body and is positionable within the patient body between an electrical ablation device and the tissue treatment region, wherein the electrode guide is separate and distinct from the electrical ablation device, and wherein the electrode guide comprises a body comprising:

a proximal surface;

a tissue-abutment surface configured to abut tissue in the tissue treatment region;

a first passage through the body from the proximal surface to the tissue-abutment surface, wherein the first passage is configured to receive a first electrode protruding from the electrical ablation device, and wherein the first passage is configured to axially restrain the first electrode when the electrode guide is positioned within the patient body against tissue in the tissue treatment region; and

a second passage through the body from the proximal surface to the tissue-abutment surface, wherein the second passage is substantially parallel to the first passage, wherein the second passage is configured to receive a second electrode protruding from the electrical ablation device, and wherein the second passage is configured to axially restrain the second electrode when the electrode guide is positioned within the patient body against tissue in the tissue treatment region;

wherein the first passage is spaced a predetermined distance from the second passage, and wherein the predetermined distance corresponds to a treatment distance in the tissue treatment region;

wherein the body comprises an elastomeric material, and wherein at least a portion of the body is moveable between a first configuration and a second configuration, wherein the body comprises an outer surface, and wherein the first passage comprises an outlet that operably closes the first passage to the outer surface when the body is in the first configuration.

8. The device of claim **7**, wherein the predetermined distance ranges from 1.0 centimeter to 2.0 centimeters.

9. The device of claim **7**, wherein the outlet operably opens the first passage to the outer surface when the body is moved to the second configuration such that the outlet permits passage of the first electrode therethrough.

10. The device of claim **7**, wherein the body generates a restoring force when moved from the first configuration to the second configuration such that the body seeks to return to the first configuration.

11. The device of claim **7**, further comprising:

a third passage through the body, wherein the third passage is configured to axially restrain a third electrode; and

a fourth passage through the body, wherein the fourth passage is configured to axially restrain a fourth electrode;

wherein the third and fourth passages are substantially parallel to the first and second passages.

* * * * *